# Rock Products

\$2.00 A YEAR

CHICAGO

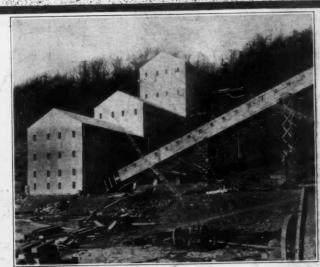
**JANUARY 1, 1919** 

225

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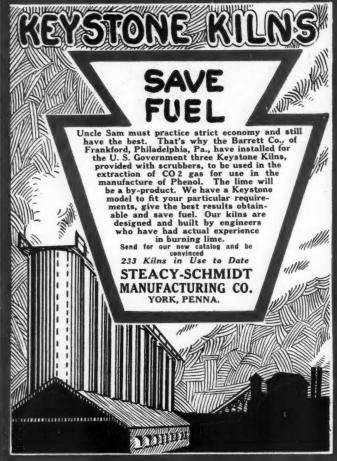
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For Crushing and Pulverizing Lime, Limestone, Gypsum, Marl, Shale, Etc. Main Frame of Steel, "Ball and Socket" Self Aligning Bearings; forged Steel Shaft; Steel Wear Liners; Cage adjustable by hand wheel while Crusher is running. No other hammer Crusher has such a big Safety Factor.

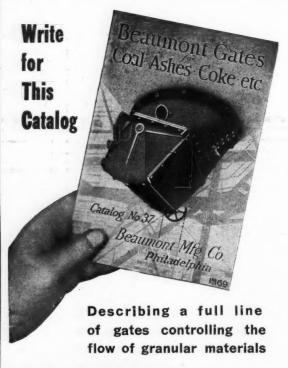
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# **SCREENS** of All Kinds



Chicago Perforating Co.



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for coal, clays, sand, stone, etc. They will burn less fuel than any other type and with their low power and repair costs are most economical to operate.



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# RockProducts

# TRADEPRESS PUBLISHING CORPORATION

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### NATHAN C. ROCKWOOD Editor

# T. BIRCHLER Assistant Editor

### FRED D. PORTER Manager

# RICHARD S. DARLING Eastern Representative

# FRANCIS L. GEHR Western Representative

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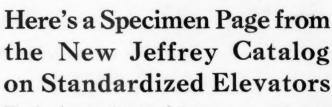
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The book contains 40 of these pages, each page containing all the information, illustrations and specifications relating to a Standard Elevator. To select the Elevator you need, just pick out the number of Elevator from this Catalog and give us the Feet Centers and Wire or Write us for Price and Delivery.

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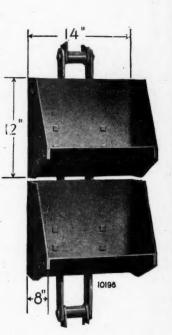
Handle it Mechanically

(Page 69)

cules Chain and 14 x8 Steel Continuous Buckets are used on Elevator 290.

Always give Elevator Number and feet Centers when ordering.

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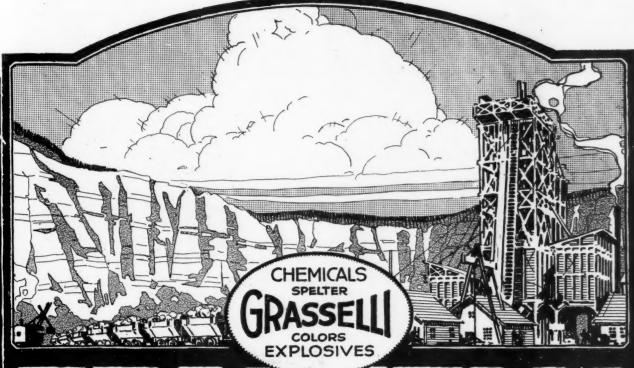
Maximum Size Pieces—not to be larger than 4½" cubes and the amount of such pieces should not exceed 10% of the whole.

Capacity—80 tons per hour of Stone or similar material. Buckets 80% level full.

Bucket-14" x 8" x 12" Steel Bucket, 12 gauge.

Chain—111 Sp. Her., K-2 Attachment, Pitch 4.78" and 7.22", Working Strength 5600 lbs., Speed 125 ft. per min.

Horsepower—9.3 at countershaft for 60 ft. centers. Approximate Shipping Weight—Machinery Terminals, 1810 lbs. Elevator per ft. centers exclusive of supports 54 lbs.



# CYPLOSIVES |

NCREASED production with reduced operating costs is more than ever vitally essential to Rock Products operators during the period of reconstruction which we are now facing.

It is in these respects that the organization of The Grasselli Powder Co. can be of immeasurable benefit and assistance. There is nothing so vitally important to operators at this time as the choice of explosives. When you select Grasselli explosives you have the satisfaction of knowing that you are using quality products which years of conscientious manufacture have established upon a firm foundation of excellence and confidence.

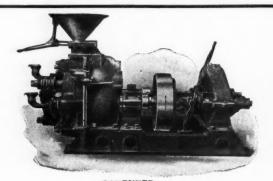
Information regarding "Grasselli" explosives will be gladly furnished upon request.

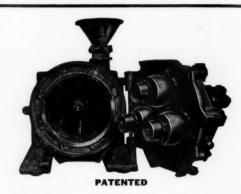
The Grasselli Powder Co.

CLEVELAND, OHIO

Janu

# STURTEVANT



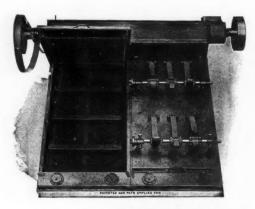


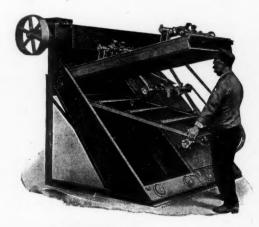
RING-ROLL MILLS

The most durable and efficient grinder for hard and moderately hard rock or ore. Used for the reduction of Cement-Clinker, Limestone, Quartz, Ores, Granite, Trap, Phosphate, Coal, etc., etc. Hundreds in use. RANGE OF OUTPUT 8—100 MESH.

Construction—"Open Door" accessibility, every part within quick and easy reach. Nothing to get out of order or give trouble. Small power, slow wear. Built in single and Duplex Designs—compact and convenient, steady runners. BUILT IN FIVE SIZES.

Action—Material passes through hopper and is delivered on inner surface of concave, revolving ring, where it is held by centrifugal force. Three convex Rolls are strongly pressed against this centrifugally held layer of material and revolve by friction against it. The Rolls thus roll over the material, first crushing it and then wedging it off of both sides of the ring.





# **NEWAYGO SUPER-SCREEN**

Unit Construction—Each unit has screens 6 feet by 3 feet and is a complete Separator in itself. Each part is interchangeable and of the most efficient size for vibrating, capacity, handling, repair, etc. By simply bolting units together a Separator of any reasonable capacity may be obtained.

The Vibration is truly wonderful and yet nothing comes in contact with the fine wire cloth, except the material being screened. Hammers jar elastic bridges far above the screen cloth, which transforms these shocks into high-pitched vibrations, when transferred to the wire cloth. The scalper is also vibrated.

Screen Cloth Tensioning—The screen cloth is stretched taut and held taut, and the tension may be regulated locally or in its entirety.

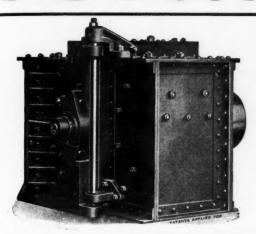
One Finger lifts the cover, and exposes the "Scalper" and Fine Screen. The "Scalper" slides into and is pulled out of the cover, like a drawer. The fine screen rests in the screen box, and is unobstructed be any mechanism, and is removed by simply lifting it out.

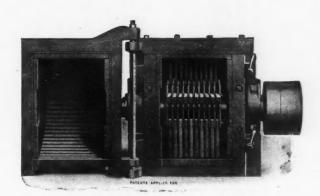
Accessibility, such as this, has heretofore been unknown.

# STURTEVANT MILL CO.

1, 1919

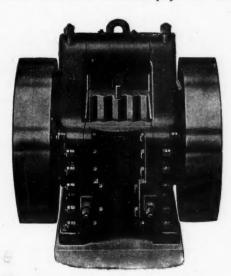
# STURTEVANT





# **OPEN-DOOR PULVERIZERS**

One man in one minute can get at every part for cleaning, adjustment, repair or for the removal of iron. Shutting down a plant is costly—accessible machinery minimizes delay. It requires minutes instead of hours to get at any trouble with Sturtevant "Open Door" Machinery. Continuous operation means economy, large production, profits and small operating costs. Labor is scarce and of poor quality—most of it is eliminated by machinery, which seldom requires attention, and when repairs must be made, a simple and accessible machine pays for itself many times over.



# JAW CRUSHERS

Action—Double Cam and Roll giving jaws two nips to each revolution of flywheels. Run at half the speed of others for same output. Slow speed means no hot boxes or bearing troubles and smooth, steady running—cheap foundations—long life.

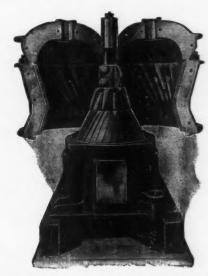
Range of Output-6" to 1/2".

Uses—For crushing anything crushable, that is friable. Jaw Sizes—2"x6", 4"x8", 5"x10", 8"x10", 6"x15", 10"x15", 6"x20", 12"x26".

Types—Coarse Cru hers—Output: 2" to 6".

Intermediate Crushers—Output: 1" to 1½".

Fine Crushers—Output: ½" to 1".



# **ROTARY CRUSHERS**

WITH OPEN-DOOR ACCESSIBILITY

Uses—For crushing large pieces of soft and moderately hard materials to 1" or to corn size and smaller. A most popular and widely used machine, Used largely as a preparatory crusher for Pulverizers.

Some of the materials being crushed in Rotary Crushers
—Lime, Gypsum, Talc, Phosphate, Shale, Clay,
Fullers Earth, Coke, Carbon, Chalk, Coal, CementClinker, Sulphur, Caustic, Chemicals, Bauxite,
Barytes, Oyster and Clam Shells, Colors, Facings,
Brick, Salt, Soapstone, etc.

Sizes-Five. Capacities-1/2 to 20 tons per hour.

HARRISON SQ., BOSTON

# There is no reason why the belt user should pay the cost of stretch

Beginning January 1, 1919 every Leviathan and Anaconda belt will be sold under a guarantee definitely protecting the buyer against stretch.

For every 1% the belt stretches after the first cut, the Main Belting Company will refund 3% of the purchase price. The first cut is excepted merely because it is generally recognized that it is more a matter of taking up slack than taking out stretch.

In the case of endless belts, the total take-up is to be charged against the belt as stretch.

This guarantee will apply on every belt we recommend---and we do not recommend Leviathan or Anaconda for positions where they do not belong.

There is no reason why belt users should pay the cost of taking out stretch in any belt.

The Main Belting Company is the only company definitely assuming this obligation.



# MAIN BELTING COMPANY, PHILADELPHIA

NEW YORK BOSTON CHICAGO PITTSBURGH ATLANTA SAN FRANCISCO

Birmingham, England Paris, France Bulle, Switzerland Kristiana, Norway Johannesburg, South Africa Petrograd, Russia Havana, Cuba

MAIN BELTING CO. OF CANADA, LTD., Montreal, Toronto



1, 1919

# SYMONS SYMONS SYMONS The Master Crusher"

# "Good Roads!"

—the slogan of every progressive State in the Union—will become a reality now that after-war conditions will permit the direction of labor towards road construction.

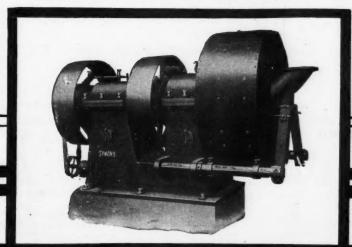
Think of the increasing demands that will be made for crushed rock and gravel!

Are you prepared to gain your share of the profits that will come with this new era of prosperity? Is your plant ready for capacity production?

Symons Disc Crushers will make your plant 100% efficient. It will pay you to investigate why it is the favorite of the most experienced producers. Write for descriptive catalog today!

# CHALMERS & WILLIAMS

1425 Arnold Street, Chicago Heights, Illinois



# Record of a 24-In. Crusher in the Field

Material Crushed: Gravel and Hard Heads.

Length of time operated, 2 years.

Size of Feed, 2 in. Size of Product,

Horsepower used,

Tons crushed per hour, 25.

Original crushing discs still in use.

No lost time account breakage.

Superior to Rolls, Jaw or Gyratory Crushers on this class of work.

# Record of a 48-In. Crusher in the Field

Material Crushed: Limestone

Length of time operated, 3 yrs.

Size of Feed, 4".
Size of Product,
1½".

Horsepower used,

Tons per hour, 80 to 100

Tons crushed per set of discs, 750,000

No lost time on account of breakage

We also build them in 18" and 36" size.



Our Bulletin R-G4 presents a clear description of details and the improvements which make Traylor Crushers preferred among operators who KNOW. Ask for it today.

Traylor Engineering & Mfg. Co. Allentown, Pa.

NEW YORK 30 Church Street LOS ANGELES 900 Citizens' Bank Bldg.

CHICAGO Fisher Building SPOKANE 612-14 Mohawk Block

NEVADA-C. C. Cottrell, Sta "At the present time we have discontinu

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GEORGIA-W. R. Neel, Stat

"It is my opinion that after th

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our construction program, retaining the fun able for work immediately following the t the present war. There will be a very la tion program inaugurated in this state and labor is more plentiful. The MICHIGAN-Frank F. Rogers, State Highway Com-

"In my opinion immediately following the declaration of world peace the largest and most comprehensive road-building program ever seen in this country will be started.

"I have been going over this proposition

time and from the information that I have pears that the only limit that w

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ON-Hon. Ernest Lester, Gover that in my opinion highway cor e greatly increased in the State of Wa. e close of the war. Quite an extensive nd building has been carried on in this er of years. As a result of the war there erial lessening in the amount of this cla The consensus of opinion

# RockProoucts

Vol. XXII

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Chicago, January 1, 1919

No. 1

# ANew Year and a New Era

NINETEEN HUNDRED AND NINETEEN opens with every indication of a prosperous year for all rock-products producers. Not only that, but it promises to be merely the opening wedge into an era of continuous good business. A spirit of widespread optimism prevails, which has its real foundation in an awakening to our great national advantages and our great national opportunities.

Deep in his heart every one of us has a feeling that since we might easily have spent billions more for the prosecution of the war the failure to spend a few hundred millions now for highways and other necessary public works would make us feel like a nation of pikers. But it is not so much a matter of spending public money to give employment to possible unemployed as it is to prepare to play the role—now expected of us—of setting the industrial pace for the entire world.

Rock-products producers of course can not look much to foreign markets for their own immediate prosperity, yet theirs is so fundamental an industry that their prosperity must actually precede all other industrial progress. Long neglected railway roadbeds must be ballasted even for safe operation; highways must be built to have even the elements of an efficient transportation system; bridges, culverts, dams,

# Good Work of War Service Committee Will Not Be Lost

A T a meeting of the War Service Committee on Mineral Aggregates, which was held at Atlantic City on Dec. 5, it was decided to disband the Committee as soon as practicable after Jan. 1. A special committee was appointed for that purpose, consisting of the Chairman, Secretary, and Treasurer, together with George D. Van Sciver. This committee will meet in Philadelphia on Jan. 6, at which time the activities of the organization will be discontinued and the Committee formally dissolved.

There has been considerable sentiment developed during the life of the Committee, favoring the establishment of closer relationship among the producers of stone, slag and sand and gravel. Already steps have been taken toward the selection of a Cooperative Committee, to be appointed from the respective national associations, which, no doubt, will foster the growing demand for a united effort in handling matters of common interest affecting these kindred industries.

If, as the result of the formation of the War Service Committee on Mineral Aggregates, a lasting desire for co-operation among these three great industries has been created, I am sure I voice the opinion of all concerned when I say that no greater good could have been accomplished.

E. Guy Sutton, Secretary.

power-houses and engineering structures without number are necessary details. All these things are fundamental to any kind of industrial development. Even our present unparalleled agricultural prosperity can not be maintained except by the artificial production and continuous use of those rock-product elements necessary to every fertile soil.

Before the war the quarry products of our country, including the products of sand and gravel pits, exceeded a total annual value of a quarter of a billion dollars. Shall we not see this figure doubled in the next ten years? For like the wise man's house the rock-products industry is founded upon a rock—the rock which provides the raw materials for nearly all the necessities and conveniences of a progressing civilization.

Through the helpful cooperation of many of its readers ROCK PRODUCTS, in the following three pages, is able to present a summary of the conditions as they look to those in the closest touch with the industries. In this summary is food for thought and cause for action. But with the experience recently gained in collective thinking and joint action there is every prospect of a happy solution of the problems presented and the enjoyment of well deserved prosperity.

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# The Rock Products Industries in 1919

Controlling Factors Are Labor and Railway Rates—No Reduction in Wages
Looked For—Prices Will Remain Up—Live Operators
Preparing for Busy Season

GENEROUS RESPONSE to a circular letter addressed to all subscribers of ROCK PRODUCTS permits a close-up view of the conditions which in the opinion of many producers in the industry, seem most likely to prevail during the coming season. It is practically the unanimous opinion of all producers that the controlling factors in the situation are Labor and Railway Rates.

## Labor Situation

Almost no one looks for an early return of normal labor conditions. The few exceptions are gravel-plant operators in rural districts who depend wholly on native labor. From the East and from the West comes the opinion that Italian and other European laborers are

on the eve of a general exodus to Europe, which will leave the lower ranks of unskilled labor pretty well depleted. Even in Texas where the Mexican is the source of all quarry labor, an operator writes, "Labor conditions here in the past year have forced us to install steam-shovel loading in our quarry. While we do not find this method as satisfactory as the old-time hand loading, still we believe that the wage scale of the future will be such as to prevent a return to hand loading."

Apparently the labor troubles of sand and gravel plant operators will be less difficult to solve than those of quarry operators, chiefly for the reason already referred to, that native Americans will work in a gravel plant when they can not be induced to work in a quarry. The possibilities of further development in labor-saving devices are not very enthusiastically regarded by the majority

of operators. Here again gravel-plant operation has perhaps the advantage of being far less of a cut-and-dried proposition. Thus, while no quarry man can see any hope of appreciably reducing costs by improved equipment or methods, several gravel operators not only express hope along these lines, but several give instances to prove it can be done.

For example in the Eastern munition district, where labor has been particularly scarce and high-priced, one gravel operator writes, "Our operating costs next year will be materially less per ton than they were the past year due to several improvements we have made especially with a view to conservation of labor, which has been so scarce." Another Eastern operator states, "By the installing of the latest equipment, we have been able to keep the cost to very nearly as low as it was before the war." Neither of these concerns could be accused of particular backwardness in operating methods before the changes noted.

# Railway Freight Rates

In the present unjust and unjustifiable freight rates on stone, sand and gravel, practically every operator sees the only real menace to an otherwise exceedingly prosperous season. As a prominent Michigan operator aptly puts it: "Increase in labor cost, in repairs and

other items can be met and reduced somewhat by more careful watching and organizing, but a freight rate is a Gibraltar against which there seems to be no way of successful attack." No one is radical enough to suggest a return to pre-war rates, all that is demanded is fairness.

There are some who hold that high freight rates furnish a very excellent reason for maintaining prices. If this refers to freight rates on machinery and plant equipment it may do very well, but in most cases the demand for the material is governed by the delivered price and the producers' real interest lies in having the delivered price just as low as it is possible to get it with a fair profit. Again there are some who see in the increased rates merely a readjustment in distributing areas. Thus the shipping radius of every plant will be reduced, but what one plant suffers another, or a new one,

will gain, the expected demand being so great as to care for all.

But new plants, even portable plants, are not created in a week or a month, so nearly all operators reach the conclusion that unless freight rates on such bulky low-priced commodities as sand and stone are reduced, expected demand for the commercial product will be seriously curtailed. Some express confidence that the rates will be reduced before spring, others are far from being so optimistic. Many bring out the point that it is in the interest of the railway men themselves to reduce rates or deprive their roads of a profitable business.

# KEEP THESE DATES IN MIND

A T the Atlantic City convention of all American Industry an unqualified endorsement was given the The Trade Association. Every industry now has a representative trade association. Membership in a national trade association is a business asset. If you are a rock products producer make it a point to be on deck at one or all of these annual conventions of the rock product trade associations:

NATIONAL ASSOCIATION OF SAND AND GRAVEL PRODUCERS

Chicago, Jan. 28 and 29.

NATIONAL CRUSHED STONE ASSOCIATION,
Buffalo, Feb. 11 and 12.

THE LIME ASSOCIATION,
Pittsburgh, Feb. 12 and 13.

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Probably this is the only argument which in the last analysis will have any weight in getting action and unfortunately conditions are not now favorable for applying it. As the Michigan operator already quoted states: "When one can go to railroad officials familiar with the conditions surrounding a business and who know with but little investigation how valuable the business is to the railroad, usually some sort of a basis can be promptly reached to the advantage of both, but with a plan that requires so much red tape and time that the need of the rate is often over before it can be made effective, doing business is going to be very difficult."

All the letters make it very clear that the freight rate problem calls for prompt, decisive and harmonious action, not so much for a general reduction, or national action for uniform rates, as for a return of those condi-

tions which permitted railway men some latitude to encourage business enterprises which are needed for freight revenues. Another season is likely to see the railways, if they are actually managed for profit, looking for all the business they can get. Also the fact should not be lost sight of that much of the material to be transported the coming season is for public works, and that there is no reason why another branch of the Government should subsidize the Railway Administration at the expense of these much needed improve-There is good reason to believe that if the material men handle the situation with discretion they will have the support of both of the public authorities and of bona fide railway men.

# Portable Plant Bogy

Closely related to the freight rate question is the possible competition of the side-of-the-road material and the portable plant. Old established and long experienced operators unanimously agree that there is nothing in They have done business long enough to have seen too many failures. Thus one Illinois quarry operator writes: "We have seen portable outfits tried out on various occasions but have never seen one remain in business more than one or two years. However, there are some people who can be easily misled with an argument that a portable stone crusher will result just as favorably as a portable threshing machine outfit." So this annual crop of suckers must not be neglected in dealing with the freight rate situation. A year of much road building will see many new and irresponsible contractors brought into the game, who are likely to learn the lesson all over again at the expense of the public. To overcome this tendency, legitimate operators should welcome specifications drawn for high-grade materials, should endeavor to live up to them religiously and

should oppose letting down the bars to inferior materials on the score of economy, which would be false economy in the end.

If construction labor is going to be high-priced, as indications point, there will be another excellent reason for discarding the portable plant, once for all, as it has been pretty generally discarded during the last few years. The abnormal increases in freight rates has given the United States Bureau of Public Roads an excuse for resurrecting the worn-out arguments for the use of local side-of-the-road material, but even here, after reciting the various advantages of portable plants, the argument ends with the following: "Small quarrying and crushing operations are always more expensive per cubic yard of output, in comparison with large-scale operations. It is all the more desirable therefore to

carry on the work so that these costs will be as low as possible, which can be done only by requiring the foreman to keep a detailed record of his expenses and the output of the plant. Constant endeavor should be made encourage foremen methods of greater efficiency in the work under them." It only needs to be added that if a contractor can be induced to keep such cost records, he will not remain long in the portable-plant quarry game, even with present freight rates, and if he has a foreman good enough to seek methods of greater efficiency, that foreman will soon have a job in a regular quarry.

# Rock Products' Service to the Readers in 1919

ITH the next issue of Rock PRODUCTS will begin a series of articles on quarry and crusher-plant operation. These articles are written by a practical quarry man of many years' experience. They will deal with the business of quarrying as a business. The series of articles on lime in the industries will be con tinued. Cement manufacturers will find interesting reading in a review of the industry in the Lehigh District written by two cement experts. Lots of good things are in store for sand and gravel producers. The rock-fertilizer men will find a chance to express themselves in a periodical not dominated by packing-house fertilizer interests.

# Plant Betterment and Renewals

The great majority of operators have kept their plants in decent repair in spite of the high price of ma-

terials and repair parts. Some of the most active and progressive men in the industry, who have the capital to do it, have been and are making extensive additions and betterments to their plants against next season's business, but the majority of operators exhibit a good deal of caution in going ahead with such plans. Many look for big reductions in the prices of machinery and equipment, notwithstanding the fact that they themselves have presented many good and sufficient arguments to prove that the price of construction materials will not come down.

To be sure, labor prices and profits in the iron and steel industries have been far above normal and there is foundation for believing that there will be a considerable readjustment of machinery prices. But there is every indication that this adjustment will be very gradual and in any event there is small chance that the prices of equipment to be used for next season's production will be affected sufficiently to warrant the delay in production which will follow if orders are not placed

early. The letters clearly indicate a tendency to hold off from placing orders for new equipment until orders are actually in hand for next season's material. If this proves to be the general practice, there are likely to be many delays and unsatisfactory results because of the sudden influx of last minute rush orders upon manufacturers for equipment. The prospects are that any large reductions in machinery prices next season will not come until after the slackening of these rush orders.

# General Building Situation

In spite of much that has been said to the contrary, most building material men do not look for an early return of general building work, because of the very human tendency, where one is spending his own money, to hold back for lower prices. These people will be encouraged by the large amount of public construction work in progress and the gradual increase of all construction work will follow. A typical view of the general building outlook is admirably summed up by the manager of an Eastern plaster company as follows: "People desiring to build will wait, hoping that both labor and materials will be cheaper. On the other hand, such work as schools, Government, state and municipal buildings, as well as the municipal improvements and road work will go forward in the early spring. This we believe, to a certain extent, will help to re-establish building activities, and we hope by the early fall of 1919 that business will have revived to a great extent."

A factor which should not be overlooked in the general building field is the farmer and his unparalleled prosperity. For example, a plaster company in western Canada has been able to keep its plant operating to about 50 per cent capacity since 1914, although building work in towns ceased almost entirely, by the great increase in building work among the farmers. There seems no question but that the removal of all transportation restrictions on construction materials will soon result in much demand for cement, lime, plaster and other manufactured building materials in small quantities in the rural districts.

# Prices Will Remain High

Enough has already been quoted to show that the opinion is universal as to continuing the present prices of construction materials. Of course the continuance of the present wage scales practically assures no radical

reductions in prices. There are so many uncertain factors in the situation that operators will be very unwise to make such a fight for early orders as to seriously reduce existing prices unless it is absolutely certain that labor conditions will improve and not grow worse as the season advances. Cost-keeping methods that show real costs will quickly convince any operator that profits under the present prices of building materials are very reasonable and justifiable. The public mind is pretty likely to be reconciled to a period of continued high prices and there is slight chance that much necessary public work will be held up because of the prices of such basic raw materials as cement, sand, gravel and stone, certainly not so long as all wages stay up.

High prices, whether there is profit in them or not, are likely to invite new competition, but such new competitors will be compelled to erect plants at a cost of from 75 to 100 per cent more than existing plants of the same capacity have cost, which will certainly retard future indiscriminate price-cutting. Moreover there is such genuine optimism over the future of the industries that no one even suggests the possibility of over-production for a long time to come.

A broad-minded attitude will welcome new legitimate producers into the field, because it is better for the industry as a whole to make them welcome from the start than to fight them from the start, as has been too often the case in times past. Publicity should be given to operating costs, operating difficulties and other data which will disillusion any who expect to make exorbitant profits, but if the field is to be retained by bona fide producers, enough new capital must be interested in the legitimate game to bring the production of commercial material up to the demand-and the demand unquestionably is going to be very great. Helpful cooperation should include the man who contemplates investing in the business as well as those already in it. As a prominent Wisconsin operator writes: "We believe that more money has been lost in the sand and gravel industry than was ever made in it. We sincerely hope that the results of war experience will be: first, a closer coöperation between the men in the industry, and secondly a more up-to-date method of determining costs. If these two things are brought about there should be no difficulty in getting a reasonable price for our goods."

# Proposed Freight Rate Revisions Soon to Be Announced-Hearings to Be Held

IT IS LEARNED on good authority that both the Eastern and Central Freight Traffic Committees are at work on a general readjustment of the freight rates on sand, gravel, slag, crushed stone and agricultural ground limestone. Contrary to rumor commodity rates on these materials are not in danger of being abolished, it is stated, but the general effect of the rates now contemplated will be upward instead of downward.

It is intended to establish a uniform rate in both these districts based on mile-

age of haul. Within congested areas around big cities the rates will probably be the actual mileage charge, but the territory generally will be divided into groups or zones of 10 or 20 miles radius within which zones the rate will be uniform. Thus a producer situated 21 miles from the point of destination would pay the same rate—i. e., the 40-mile rate—as a producer situated 39½ miles from the point of destination, in case the territory is divided into 20-mile groups.

It is stated authoritatively that no

changes in present rates will be made juntil all shippers have a chance to be heard.

ROCK PRODUCTS has received many letters urging the importance of the freightrate question and the desirability of an early agreement on the points at issue. The editor will be glad to receive and publish the views of men in the industry as to the most feasible attitude to take in the coming struggle for a fair consideration of the case by railway men. 1919

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# Form First Mineral Aggregate Association

Wisconsin Gravel and Stone Men Bury the Hatchet and Set Precedent in Co-operative Effort



Officers and Directors of the Wisconsin Mineral Aggregate Association

PRESIDENT—A. J. Blair, Lakeshore Stone Co., Milwaukee. Vice-President—J. C. Buckbee, Northern Gravel Co., Chicago.

Secretary-Treasurer—I. M. Clicquennoi, Wisconsin Sand and Gravel Co., Milwaukee.

Additional Members of the Executive Board:

Ed. E. Gillen, Waukesha Lime and Stone Co., Milwaukee.

J. K. Jensen, Janesville Sand and Gravel Co., Janesville, Wis.



MicgwEmnn

WENTY-FOUR CONCERNS producing mineral aggregates—comprising about 75 per cent of the state's total annual production of 2,000,000 tons-were represented at a meeting called in Milwaukee, Dec. 19, under the auspices of the War Service Committee on Mineral Aggregates of the 14th District. For several years these concerns have supported two state associations -a sand and gravel producers' association and a crushed stone association. The hard times of the last year or two threatened the extinction of both; then came their forced co-operation through the War Service Committee. At the Milwaukee meeting, Dec. 19, all came out whole-heartedly for continued co-operation in a new, unique and pace-making association-the Wisconsin Mineral Aggregate Association.

The formation of this new organization is largely due to the untiring and loyal efforts of A. J. Blair, District Chairman of the War Service Committee on Mineral Aggregates, who is also president of the National Crushed Stone Association and of the Wisconsin Crushed Stone Association, and I. M. Clicquennoi, who has been the leading light in the Wisconsin Sand and Gravel Producers' Association. 'Their tactful handling of the War Service Committee work resulted in a widespread desire to continue these efforts, and the enthusiasm shown at the original meeting gives every premise of success.

In calling the meeting Mr. Clicquennoi issued the following appeal, which well summarizes the situation:

### United Efforts Essential

"We ask you to meet and form an association to promote and protect the interests of an industry whose investments in Wisconsin are well over \$5,000,000, producing annually over 2,000,000 tons of product. Such is the magnitude of the mineral aggregate industry in Wisconsin, although many of you may not realize it is so vast. Can you afford to allow so large an industry to go unorganized and unguided with yourself an integral part? The efforts of the past along narrow and diversified lines are concrete examples of the necessity of united effort. Various divisions of this industry in Wisconsin have worked to their own ends, and many times conflicting and nullifying the efforts of each other. Good judgment tells us it should be otherwise. Stone, sand and gravel are united in their use, why not united in their efforts to secure a common purpose.

"There are many reasons why Wisconsin producers should organize. Among the many common aims, may we enumerate ten of the more important:

- 1. The promotion and extension of the uses of concrete.
- 2. The standardization of sizes, weights and measures.
- 3. Legislation relative to the use of a common product.
- Promotion of a clean uniform aggregate.
- 5. The adoption of reasonable and uniform specification by architects and municipalities.



- 6. A general and efficient cost system.
- 7. The settlement of the railway rate problem.
- Joint action in securing relief from traffic disturbances.
- Promotion of a general good fellowship and a higher business ethics in the industry.
- 10. The centralization of our efforts in bringing the industry up to a standard of efficiency and good management whereby we may operate under conditions conducive to a fair return on a sound and stable investment, strictly in accordance with the recommendations of the United States Chamber of Commerce.

"The discussion of these in your committee (made up of representatives of both industries) convinced them of the urgent need of a united effort. Do they not appeal to you as worthy of thought and action? This same spirit of united effort is being discussed and acted upon throughout the United States. It is the lesson of the great war to industry. It makes possible accomplishments which, individually, could never be realized.

"It is not sufficient to be a booster for your national organization; they too are worthy of your support. They will assist you in national affairs; your state organization is your own home effort, your "general office." Every accomplishment will go directly home. You cannot be situated in a too remote part in the state to receive immediate benefits. It is not an experiment or a chance, but a safe and sound undertaking based upon principle and common sense."

# No Dissenting Votes

The meeting had not progressed very far before it was apparent that the sentiment was practically unanimous in favor of the new organization. Adjournment to lunch and an address by J. N. Van Der Vries, a special representative of the Chamber of Commerce of the United States, resulted in crystallizing this sentiment into a working organization. Mr. Van Der Vries had familiarized himself with the case of the two industries and made the following points:

Multiplicity of organizations leads to (1) waste of energy due to duplication of effort; (2) probability of working at cross purposes; (3) waste of funds in maintenance; (4) lack of leadership and common purpose; (5) ill feeling and rivalry resulting in defeat of meritorious projects; (6) insufficient finances in any one organiza-

tion, thus rendering it unable to accomplish results. By consolidation of the two interests he saw the following advantages: (1) conservation of energy; (2) lessening of the total expense; (3) assurance of a common purpose; (4) provision for common leadership; (5) elimination of rivalry.

### Organization Perfected

The accompanying constitution was adopted with little discussion. It is here printed in full, because it is probably the first constitution of a Mineral Aggregates Association.

# Constitution of the Wisconsin Mineral Aggregate Association

CONSTITUTION

### ARTICLE I: NAME

The name of this Association shall be: "THE WISCONSIN MINERAL AGGREGATE ASSOCIATION."

### ARTICLE II: OBJECTS

A. To promote and extend the uses of mineral aggregates by devising ways and means of conveying to the public the merits of the product.

B. To create and extend cordial and friendly relations among the producers and users of mineral aggregates; to discourage unfair and unscrupulous business methods; to promote a higher and better business ethics.

C. To introduce and encourage a uniform cost system whereby each producer may know his true cost production; to collect and disseminate production and cost data among producers, in order that all may profit by experiences of others.

D. To furnish producers confidential information on credit standing and responsibility of the mineral aggregate buyers.

E. To accomplish by united effort all the common operating conditions conducive to efficient production, such as, proper common carrier rates, demurrage charges, specification. uniformity of sizes, car shortage, and other items of general interest.

F. To bring the industry up to a standard of efficiency, whereby all may operate under conditions conducive to a fair return on their investments.

G. To conduct all the efforts in strict conformity with existing laws and in no manner to restrain trade or competition.

H. To do any and all things of interest for the Association as a whole.

# ARTICLE III: MEMBERS

Section I—Any person, firm or corporation engaged in the production of a mineral aggregate for delivery to destinations in the State of Wisconsin may become a member by the affirmative vote of the majority of the Executive Board.

Section II—Applications for membership and resignations must be made in writing to the Secretary-Treasurer.

### ARTICLE IV: OFFICERS

Section I—The affairs of the association shall be administered by an Executive Board, consisting of five members chosen at the annual meeting, and to serve one year or until the election of their successors.

Section II—The general officers of this Association shall be a President, Vice-President, and Secretary-Treasurer. The officers shall be elected at the annual meeting and serve without salary for one year, or until their successors are elected. The President, Vice-President and Secretary-Treasurer shall compose three of the members of the Executive Board.

ARTICLE V: MEETINGS

The annual meeting of the members of this Association, for the election of the Executive Board and regular officers, or any other business, shall be held in the city of Milwaukee on the third Thursday of December in each year, at such an hour and place as the Executive Board, or in default of such selection, the President may designate.

# ARTICLE VI: AMENDMENTS

Amendments to these articles may be proposed at any annual or special meeting of the Association. Due notice of such amendments shall be given in writing to each member at least ten days in advance of the meeting at which such amendments are to be voted upon. An amendment to be adopted must receive at least a two-thirds majority of the members present.

# BY-LAWS

Section I—Executive Board: The Executive Board shall have the management of the affairs of the association and fix dates and amounts of assessments necessary to carry out the work of the Association. They shall fix the time and place of their meeting, and provide rules for their government.

Section II—President: The President shall preside at all meetings of the Association and perform such duties as directed by any action of the Association.

Section III — Vice-President: The Vice-President shall perform the duties of the President during the absence of the President.

President during the absence of the President. Section IV — Secretary-Treasurer: The Secretary-Treasurer shall keep a record of the transactions of all the meetings of the members, and a record of the membership, and have general custody of all transactions. He shall collect and receive all money of the Association and also pay all orders for money when countersigned by the President. He shall keep a correct record of all financial accounts of the Association, and submit a semi-annual report to the members of the Association and give bond, the expense of which shall be paid by the Association.

Section V—Special Meetings: Special meetings of the Association may be called by the President or by any two Directors. The time and place of such meetings may be determined by the persons calling them.

Section VI—At least five days' notice shall be given of all meetings of the Association, by mailing a written notice to the last known address of each member.

Section VII—Notice of all meetings of the Executive Board shall be given by mailing a notice thereof to each member at least five days previous to the proposed meeting. No notice will be sent when all members are present

Section VIII—The first meeting for the election of officers and the Executive Board shall be held at the Hotel Wisconsin, Milwaukee, Wis., December 19, 1918.

Section IX—Voting Power: Each member shall be entitled to one vote. In case of a firm or corporation, one vote of such a firm or corporation may be cast by the officer or agent authorized in writing. Any member may vote by proxy.

Section X—Any member of the Association may be expelled for cause by a majority vote of the Executive Board. Shall such an expelled member within ten days protest in writing to the Executive Board, the said Board must within ten days call a special meeting of the Association. The expelled member can only be reinstated by a majority of the members present at this meeting.

Section XI—The Executive Board may appoint employees, fix the duties, titles, and compensation.

Section XII—Quorum: A majority of the members of the Association present at any meeting shall constitute a quorum. Three shall constitute a quorum of the Executive Board.

Section XIII—Order of Business: The order of business shall be:

A. Roll call.

B. Reading of minutes of the previous meeting.

- C. Action on proxies.
- D. Nomination.
- E. Election.
- F. Report of officers.
- G. Report of committee.
  H. Unfinished business.
- I. New business.

Section XIV—These By-Laws may be amended at any meeting of the members by the affirmative vote of a majority of the members present.

# To Build 10 Oil-carrying Concrete Barges

PORT ARANSAS, Texas—One of the largest concrete barge building plants in the United States is being constructed here by the MacDonald Engineering Co. It is stated that the initial capacity will be ten oil-carrying barges, costing about \$1,000,000. The order is from the France to Canada Oil Transport Co. of New York, which is preparing to transport Mexican oil through this port on an extensive scale.

The MacDonald Engineering Co. is building a 1,100-foot wharf and three standard 55,000-barrel concrete oil storage tanks. It will also construct large machine shops, wood-finishing shop, electric light plant, ways and other adjuncts of the plant. Each of the barges will be 270 feet long, 33-foot beam, 21-foot draft and have a carrying capacity of 12,500 barrels of oil.

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# Indiana Crushed Stone Men Will Spend Money to Develop Market

Members in Annual Convention Vote an Additional Assessment and Provide Also for an Extra Tonnage Tax to Further Interests of the Industry

PROMOTIONAL aggressiveness and closer co-operation will mark the activities of the Indiana Crushed Stone Association for 1919. This belief is the resultant of the general discussions and definite decisions made by the membership at the eighth annual meeting and banquet at Hotel Claypool, Indianapolis, Dec. 17

To the ends indicated the finance committee had proposed an addition to the annual dues of each company member, making the assessment on each member \$400 per year. This was accepted without a dissenting voice. To this was added an amendment for a second additional tax on a tonnage basis of one cent a ton if neces-

This action perhaps as clearly as anything done expresses the feeling of confidence and optimism prevailing at the gathering and the determination to take advantage of the great 1919 opportunities.

### Cost Accounting

A motion by E. B. Taylor for a committee to investigate and study the matter of costs, production conditions and markets with a view to establishing a uniform cost accounting system was adopted unanimously. The secretary, F. W. Connell, Bernard L. McNulty and A. B. Meyer were

It was largely through the remarks of Mr. McNulty who talked of the need of a correct and uniform system and its benefits that the matter came to a head. He startled all but one producer by asking: "How many of you have figured the costs and made a charge in your accounting system for the shut-down period? This item the government has required of the lime producers who had overlooked it, and it is a proper item for a charge."

Only one firm represented claimed to have considered the item; the others were more or less surprised. Depletion and depreciation charges were also mentioned. Mr. McNulty told of the man who figured only labor and material in his cost figures as proving the wide diversity of ideas on what properly constitutes costs.

# Fund for Promotion Work

It was Mr. McNulty again who led agitation for a greater fund than the finance committee had provided for. He declared \$400 dues from each member was insufficient for any valuable work for the good of the association and the industry,

# POINTS FROM THE SPEAKERS' TABLE

"Kindred businesses must live. There is room (business) for all."-E. B. Taylor, Toastmaster.

"Organization is the trend of the times, it is the demand of good business and is encouraged by official Washington. I believe the state should look after its own roads and have full authority over them. I favor one strong man who can and will boss the good road policy of the state. We legislated for the railroads, we subsidized them, we took off our hats to them and let our highways go to hell, didn't we? Highways never received encouragement and the financial help they should have received—and they should come first. Remember that the railroad lobby is trying to check highway building."-A. P. Sandles, Executive Secretary National Crushed Stone Association.

"I favor wide roads." -Jos. G. Hayes, President, Indiana County Commissioners' Association.

"At present with 92 counties we are confused with 92 varieties of specifications. The sooner we will have centralized power in road building the sooner will the specifications be standardized."-R. C. Yoeman, Associated Professor of Highway Engineering.

that if the products of the association were pushed as they should be in the opportune months just ahead adequate finances would be needed for publicity and educational work.

"What is \$400 to a concern with a plant costing \$50,000," he asked. "Let us double, triple, yes, quadruple this special tax. If you double it, it means little more than another dollar a day. Let us try this year to keep our plants running every day we possibly can. Wouldn't it be a profitable investment if by taxing ourselves a few dollars a day we get ten dollars for every dollar we thus spend and decrease the period of the shut-down?"

He based his talk on the experience of the Lime Association, the executive committee of which he is a member, and so his

argument was not theoretical only.

There being opposition to a further lump increase because of possible injustice to some of the smaller producers, it was unanimously agreed that the amendment providing for a one cent a ton assessment on 1919 production would be most just, if levied when the money will be needed.

### New Officers

The following were unanimously elected · officers for 1919:

President-John Collett, Ridgeville, Ind. Vice-President-C. N. Hodgin, Kokomo,

Treasurer-E. T. Milligan, Muncie, Ind. Executive Committee Members-L. H. Hawblitz, Toledo, O.; Bernard L. McNulty,

The executive committee, which includes the officers, re-elected F. W. Connell execu-

The retiring officers were: President, V. G. Pogue; vice-president, L. H. Hawblitz; treasurer, E. B. Taylor; executive committee members, F. W. Van Natta and O. H. Binns.

### Secretary's Report

The reading of the fifth annual report of the secretary disclosed the fact that this officer had been extremely busy among other organizations watching out for the interests of the industry. He was appointed by two other organizations on their legislative committees, and he was named chairman of both committees.

# Struggle for Sane Road Supervision

His report says:

In August we attempted with the assistance of the Purdue University to organize a County Surveyors' Association, hoping that by so doing they would get together and introduce a bill at the next session for a law making it necessary for the county surveyor to be a civil engineer. We feel that this would be of considerable assistance to us in getting standardized specifications adopted in the different counties, and thus protect to a certain extent the crushed stone interests, because we all know that macadam failures are due to faulty construction.

The legislative committee meetings of the county highway superintendents held at your office December 4, adopted this motion: "That the appointment of the county highway superintendents by the county commis-sioners shall have to be approved by the State Highway Commission.

It was the opinion that this law would have a tendency to prevent the County Board of Commissioners from removing highway superintendents so often (for political reasons)."
Governor Goodrich called a meeting Nov.

23 at the Hoosier State Automobile Associa-

tion, of all different interests. Your secretary made every effort to have the three-mile road law endorsed but was unsuccessful. At the afternoon session a motion was carried for the appointment of a committee of two to draft a state maintenance bill. Mr. Adams, president of the automobile association, and your representative are on this committee.

## Propaganda Needed

We have suffered perhaps more than any other business on account of the war. Practically all road building ceased, maintenance was neglected, railroads were unable to handle extra demand for transportation facilities. Consequently at present we have

more road boosters than ever before, such as leading newspapers, periodicals that are not directly interested in road material as well as many influential individuals that are in no way connected with road material industries. Now is the opportune time to start a bigger road propaganda than ever and I feel confident if the operators will put the industry on a real business basis and will give their hearty co-operation to this organization it will mean a long period of prosperity for the crushed stone industry.

### The Banquet

The banquet in the Italian room of the Claypool, Dec. 18, brought out a large

attendance. It was a feast of song, story and preachments as well as of food. There was something doing every minute. An orchestra and group of soloists enlivened the whole evening.

E. B. Taylor, of Greencastle, was toastmaster. The speakers responded to toasts in an excellent spirit of optimism and none spoke more to the point of incentive and encouragement than A. P. Sandles, who, with his fund of facts and figures, sweep of knowledge and analysis of trend of events was most impressive.

# Kentucky Crushed Stone Association Is Perfected

OFFICERS ELECTED President-W. J. Sparks, Mount

Vice-President-F. W. Katterjohn, Paducah.

Secretary-Treasurer—R. B. Tyler, Louisville.

KENTUCKY now has a Crushed Stone Association of which all those doing a stone-crushing business in that state are invited to become members. The membership or entrance fee is \$10 and other funds or dues required for carrying on the work will be raised by a system of tonnage assessment.

The formal organization of the Kentucky Crushed Stone Association was completed at the Seelbach Hotel in Louisville, December 18, the date set for this work at a preliminary gathering November 27. The purpose of the organization is to get together all the crushed stone men of the state for mutual benefit and cooperation. All those whose names are in hand have been invited by letter and will be appealed to again join in the good work. Also Secretary Tyler asks that an appeal be made through Rock Products to any who may not yet be included in his lists to get in touch with him that he may explain the purposes of the association and get them into membership.

The newly formed organization, after electing officers, properly concluded to become identified and to affiliate with the National Crushed Stone Association, and Secretary-Treasurer R. B. Tyler was named as delegate to attend the National meeting at Buffalo, February 11-12, as representative of the Kentucky organization.

Those who attended and participated in launching the new Kentucky association feel enthusiastic both over the business prospects ahead for the year and over the good work which they believe can be accomplished through concerted action.

# The Attendance

W. J. Sparks, Mount Vernon, representing five plants.

F. W. Katterjohn, Paducah, representing two plants.

J. W. Megown, English Stone Co., Willow, Kv.

W. J. Piggot, Webster Stone Co., Irvington.

John T. Edmunds, Cook Stone Co., Hop-

T. B. Ripy, Kentucky River Stone & Sand Co., Tyrone.

W. W. Peete, Bowling Green & Green River Quarries Co., Bowling Green.

R. B. Tyler, R. B. Tyler Stone Co., Louis-

# Illinois Will Boom With Construction Work

PARKER M. LEWIS, of the American Sand and Gravel Co., Chicago, considers business prospects for 1919 excellent, particularly in Illinois. In an interview with a Rock Products' representative, he

"An era of great prosperity is ahead of us. With the beginning of spring, there will come a wealth of business affecting the building trades. In Chicago alone there will be many millions of dollars' worth of improvements. This will include not only the many millions to be expended in projects that have been held up by the war, but also new projects.

"The widening of Michigan-av and the new bridge at Rush-st forming the connection between the north and south part of this improved boulevard will mean millions. The great union station planned for the west side is an undertaking of great magnitude. Much has been done, many hundreds of thousands of dollars spent on preliminary work, but even so, only a small part of the whole. Few people realize that this structure entails work of a physical character extending from Lake-st to 12th-st on account of the problems of sewerage, water and other mains and street levels.

"The structure itself will be a mammoth affair calling upon the building trades and producers of concrete aggregates for much material.

"The City Beautiful plan will go ahead without doubt and this will bring to a head the proposed great union station for the Illinois Central and other railroads at 12th st and the lake.

"Next spring too, the subway matter

must be settled; our transportation systems are too inadequate for it to be much longer delayed. A new proposition will undoubtedly be referred to the people in the spring and this time it will carry I believe. Bear in mind that in the construction of a subway the quantity of concrete used is enormous-it seems almost endless. There are busy times ahead for all of us.

"Probably the biggest item of all is the good roads plan for Illinois. The people voted for the \$60,000,000 bond issue and that proposition will certainly go ahead.

"The war ended at just the right time. There is a cessation in the building lines at this time anyway, so now we can all prepare for the great day in spring. Meanwhile the architects and engineers can plan and next spring we will find enough work ready to keep us all busy for a long time."

# Death of Hale Roberts

WHEN death claimed Hale Roberts, president of the Hale Roberts Stone Co., of Iowa Falls, Iowa, Dec. 5, it took away one of the best known stone producers in the country, and, in a way, a pioneer in crushed stone activities. Early in his career he sold crushing machinery.

Mr. Roberts was born in Racine, Wis., Nov. 30, 1858. He spent his boyhood days on a farm and in early manhood went on the road selling farm implements. Later he sold stone crushers and it was while engaged in this line that he was induced by the late E. S. Ellsworth to go to Iowa Falls and take up the production end of the business. Twelve years ago he went to Iowa Falls with his family and became president of the Ellsworth Stone Co. He conducted the business successfully until the deposit gave out.

Five years ago he organized the Hale Roberts Stone Co. with a quarry at Alden, Iowa, which is still in operation.

Mr. Roberts was a public spirited citizen and took part in community affairs. He was a member of the Congregational church and an active participant in its work. Mr. and Mrs. Roberts had planned to leave for California for the winter on the very day he passed away.

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# Sand and Gravel Industry to Prosper

President Donnelly of the National Association of Sand and Gravel Producers Urges Everyone to Profit by War's Lessons

URING THE PAST YEAR, owing to the fact that the United States was engaged in the greatest war in the history of the world, it found it necessary to mobilize not only the man power of the nation, but also the internal resources, in order to meet every demand that might be made. As a result, restrictions were placed upon all kinds of building, highway construction and every other branch of trade or business into which the wares of the sand and gravel producers enter. Naturally and necessarily their business was curtailed and they were compelled to mark time in order to enable the Government to develop to the highest degree those activities and industries most necessary in supplying and equipping its great army, which reached the enormous figure of more than four million men. With this army it was enabled to join the Allies in forcing the Kaiser and the German nation to accept the terms of the armistice submitted and dictated by the Allies.

The restrictions placed upon our industry have therefore been removed and the way cleared for constructive work in the United States, which means an immediate and growing demand for our products. This is seen:

First: In the agitation just now going on, emanating in Washington and extending into every part of the country in favor of good and permanent roads and highways. The work of the Highways Transport Committee, which is a part of the Council of National Defense, will probably be taken over by the Federal Government and directed by a Commission created by Congress. The movement of freight by motor trucks, which was a part of our war necessities and activities, and the development of the rural mail deliveries by motors over the roads and highways, all have brought to the attention not only of the Federal Government, but of every community in the United States, the importance and absolute necessity of building roads and highways capable of caring for the added traffic, which is bound to continue to develop. The motor express, which has come into existence and which has been so much stimulated by the work of the Highways Transport Committee, has but emphasized and brought to the attention of the producing and commercial interests of this country, the value and importance of good roads and the part that they play in solving correctly the transportation problem in the United States.

Therefore, we have a right to confidently expect that during the coming year, the demand for our products in the building and development of highways in the United States will be far greater than it has ever been in the past.

Second: The railroads of this country must have and will require a greater supply of our products in carrying out the program which must necessarily be carried out for improvement and development of the various railroads. The taking over and operation of the roads by the Federal Government and the great congestion and delays in the transportation not only of the supplies for the carrying on of the war, but of the general commerce of the country, have exposed and brought to view the fact that the railroads must be in better condition and brought to a high state of improvement in order to meet the demands of the coming year. The roadbeds must be improved and new lines built, which call for ballast, and therefore will create a greater demand for our products.

Third: The building industry, which is dependent upon its ability to procure the products of our industry and which was not only checked, but almost stopped in this country by the rules, requirements and necessities of the Federal Government during the war period, should open up and afford a good market for our products during the coming year. There is scarcely a commodity throughout the United States, where some large project has not been held in abeyance by the orders issued in Washington. And there certainly is not a community where the war, its activities and restrictions has not checked building, which now will go ahead to completion. These things, being true, it would appear that the tide in business affairs, which has been so largely in favor of the munitions manufacturers, must turn in favor of other business, and our industry should be one of the first to profit from the new and normal conditions. With the return of the soldier boys to civil life, the scarcity of labor in this country will disappear and the contractor and the builder, whether of highways, railroads or buildings, will be enabled to obtain the necessary labor for the carrying on of the work which is sure to develop.

One lesson that the war has taught, and which I believe every member of our organization and every man engaged in our industry has learned, is the value of organization and coöperation in any and every business. Before we entered the war and before the necessity of conserving our resources and bringing everything to the highest possible stage of development and efficiency in this country was realized, there had grown up an antagonism to big business and an opposition to organization of, and coöperation between, those engaged in the same line or class of business. There seemed to be no well defined line between lawful and unlawful combinations, and every organization of men

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engaged in the same line of business was looked upon with suspicion. All this, we hope and believe, has been changed. Those in authority at Washington, not only, but every man in authority throughout the United States, and wherever we were engaged in marshalling our forces and resources to win the war, learned the value and necessity of cooperation to the highest degree. And many things heretofore considered as in violation of the law and contrary to the rules of good business were encouraged. It is very evident that organizations like ours, which are intended simply to promote and encourage that friendly cooperation which is free from any and everything contrary to the spirit of law or the spirit of fair and honest dealing between men, will no longer be construed as contrary to good business principles or in any way out of harmony with the spirit of the laws of our nation.

In the past, I am sorry to say, our industry has not occupied as high a place in the commercial world as it should when measured by its importance and the volume of business done. It is and should be recognized by the financial world as an industry without which the growth and development of this country would be impossible, for without good roads, without proper railroad construction and without the constructive work of our building activities, little progress could be made and the march of progress in this nation would be halted.

If we but continue the work of our organization along the lines of real cooperation; if we profit by the experiences of the past year, which have shown beyond question the value of united effort in obtaining recognition and concessions from those in authority; if we but continue the good work of our secretary, Mr. Sutton, which has brought such good and profitable results; if we but bring into our organization every man who is engaged in the business of producing sand and gravel and thereby increase our membership to the greatest possible number; if, in short, we take advantage of conditions as they are and apply to the solution of questions affecting our industry those lessons which we have learned in the past, we will see our business not only grow and develop, but we will see it take its proper place in the fields of commerce and receive the recognition to which it is entitled in the business world.

Many millions of dollars are invested in the business in which we are engaged, and it is the duty of those who control the destinies of this business to avoid the pitfalls and dangers which arise by unfair competition and unfair methods in business. Our experience has taught us that if we are to grow and develop as we should grow and develop, and if we are to reap the profits to which we are entitled in this business, it is necessary that we work early and late for the proper understanding between the shipper and the railroads, in order that both may be treated fairly and each consider the rights of the other.

I have no specific suggestions to make, but desire simply to call the attention of all producers of sand and gravel to the great importance of a proper solution of this question, in order that the industry may not be crippled through some misunderstanding with the railroads, or through the neglect of the producers to work out the proper length of hauls and the rate that should be made with the railroad companies.

Another thing of great importance to us is that each member install a proper system of cost accounting and that, if possible, a system be developed which will be adopted by every member, in order that our business may not suffer through the acts of some producer who does not know or understand the cost of production, and therefore make impossible the realization of proper profits to which he and all others engaged in this business are entitled.

It has often been said that competition is the life of trade. But it may equally well be said that competition not based upon good business principles and of the cut-throat variety, with which we have all had experience in the past, is the death of trade. Therefore, it can be said that the greatest friends and also the greatest enemies to the success of our business in the past, have been found among the producers themselves, for to my mind, the man engaged in this business, who does not properly reckon the cost, who does not act along the lines of fair dealing and who fails to understand the absolute necessity of the realization of profits sufficient not only to pay a fair income upon the money invested, but also to maintain and keep in order the machinery and equipment used in the business, is unfair to himself and a real enemy to those engaged in business competition with him.

In conclusion, let me say that I appreciate the opportunity of extending a word of greeting to the members of our industry and of making the few suggestions that I have herein made. The future of our business is in the hands of the men engaged in it. The realization of the best results by the men who have invested their capital in this business will come only through united work and effort and a proper coöperation among those who are now or may become members of our organization.

Therefore, let me, as a parting word, urge again, as I have already done, the value and importance of the continuation of the strengthening of the Association of Sand and Gravel Producers. In that way, and that alone, will it be possible for each one of us to derive the benefits to which we are entitled during the wonderful years which appear to be ahead of us.

Wishing you, one and all, a Happy and Prosperous New Year.

# HARRY DONNELLY,

President, National Association of Sand and Gravel Producers. 1919

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# New Type of Gravel Road to Be Proposed at Convention

Intensive Program of Value Planned—Freight Rates to Be Discussed by Experts—Round Table Talks on Plant Operation

Something new under the sun—something entirely new in gravel roads. That is the promise contained in the tentative program for the convention Jan. 28 and 29 at Hotel La Salle, Chicago, of the National Association of Sand and Gravel Producers.

Gravel roads will be discussed from every angle—every kind and type—by one or more road engineers. It will be a thorough, reliable, practicable presentation of the subject, says the committee on arrangements, and out of that discussion the gathering will learn of the new type of road, a purely gravel proposition. It alone will be worth the attendance of every producer in the industry.

There will be other features. The Round Table will be one. There will be discussed for instance, the practical management of sand and gravel plants. This ought to disclose some new proven ideas of benefit to producers.

Freight rates, a question of such moment to gravel producers will be the subject of talks by experts. In addition the special committee authorized by the Executive Board to study the question will make its report. The committee will be assisted meanwhile in its investigations by experts.

A geologist will tell where the sand and gravel came from and how it got where it is—something which a few know about and some others merely think they know.

The two-day convention will be so crowded, so much so that the committee has been troubled by the time limitation. In consequence the railroad problem (government ownership vs. private ownership) with all its subsidiary problems which so

many feel require study and elucidation, has no place on the program. It is impossible to give the subject the time it requires in the two days.

In view of the fact that the program as planned will crowd the two days—it is an intensive program still in the making—and in order to permit a presentation of the railroad problems by students and experts, it would appear that the association should extend its deliberations one day longer. This would reduce the tension under which the assembly would be subject by too long and continuous mental application, and thus bring relief.

The annual automobile show will be on the same week in Chicago, and this suggests that reservations at hotels be made at once. Reservations may be made through the committee on reservations, care of Hotel La Salle. The convention will be held in the Red room of this hotel.

Notices of the convention and copies of the proposed revised constitution are being mailed to members and also to producers who are not members. The latter are especially invited to attend and participate in the reorganization. The committee on arrangements consists of B. H. Atwood, Frank Renwick, H. D. Conkey and E. Guy Sutton.

# Bonus System in Gravel Plant

Beloit Sand and Gravel Co. Keeps and Satisfies Employes by Paying for Extra Cars Loaded

KEEPING labor satisfied, keeping it enthusiastic, keeping up the capacity of a plant and even excelling the production usual under ordinary conditions is a problem, which if, and when solved, is a welcome addition to the sum of knowledge and experience. Such a solution manifestly means the end of labor troubles (or nearly so, because to end all trouble permanently would be the attainment of the millennium); it means high production and lower costs by decreasing the maintenance ratio.

George A. Rubin, president and business manager of the Beloit Sand & Gravel Co. of Rockford, Ill., believes he has gone a long way toward the solution of that problem by the adoption of a bonus system in which all employes at the pit participate. He is confident of its success, in fact, declares that it is proven by the results obtained at the plant which is near Beloit.

In describing his plan, he says:

"We pay our men the regular scale of wages, and in addition the sum of five cents per car extra for each car loaded. This would mean \$1 per day extra on a capacity of twenty cars. The foreman gets twenty cents per car extra and as our force consists of five men and a foreman, it costs us forty cents per car more.

"If, by this method we are able to pro-

duce one car per day more than we would on the regular scale of wages, and we are sure we exceed this, there is considerable profit on this car for the company. We



feel that under no other methods could we receive the enthusiasm and efforts put forth by the men each and every day to produce as many cars as possible.

"Under this method, the foreman is not obliged to devote most of his time in looking after the men, as each one works for his own individual benefit, thereby permitting the foreman to devote his time to things of greater importance.

"We have given this system our careful attention, and would not change it for the regular salary proposition under any circumstances. It puts the responsibility on each and every man, and, while the sum allowed is small, it counts up to considerable at the end of each week.

"It is surprising to see the extra efforts put forth by the men to increase the number of cars each week."

A demonstration of the enthusiasm of the men to load extra cars was observed by a representative of Rock Products. The railway had shunted several cars onto the siding late in the day, and the men were anxious to work overtime loading in order to get the bonus. There was no delay in getting cars set. While one was being loaded another car was gotten ready to slip into position.

In the matter of costkeeping the company divides its expenses into two parts, General and Plant expenses. Under General come salaries, office, selling, publicity, interest, insurance items. Under Plant expense are listed wages, power, depreciation, depletion, repairs, miscellaneous items like stripping.

# Why No Quarry Man Can Afford to Miss the Buffalo Convention

President Blair of the National Crushed Stone Association Extends Cordial Invitation to All

T DID NOT TAKE LONG to lick the Kaiser after the Allies established unified command—the old, old truth that in union there is strength. What industry needs strength more than ours? I know of none where an equal amount of time, energy and thought produces so little return on the investment. Why should crushed stone operators be working for little or nothing? It is due mostly to competition of some operator who does not know his costs-sometimes to only imaginary competition-allowing some little operator to set the price. An operator getting long on a par-

ticular size and making a low price to move it upsets the market because his competitors do not understand the reason for the low price.

There are other reasons, but I think the first one mentioned covers about 99% of the troubles in our business. I cannot imagine any sane man knowingly selling his entire output below cost or even without some profit. What is the remedy? Just one word answers-Association. Get to know your competitors-they are all human-have the same troubles and difficultiestalk over methods, costs, and so forth.

It is funny how bad practices fade away once you get acquainted with

each other. Help each other out by talking sizes that are long. It is better to make a low price to your competitor than to his customer.

The annual meeting of the National Crushed Stone Association is to be held at Buffalo, February 11 and 12, and I hope to see every crushed stone operator present. All operators should be members and help make the association something that will do you all good socially and financially. We have a good start but need more members to make it strong financially and numerically and thoroughly representative. golden opportunity lies before us. Are we going to grasp it and make the most of it, or are we going on drifting aimlessly as we have in the past with some one rocking the boat most of the time. It takes membership and support to lend effectiveness. Come to the Buffalo meeting and if not a member hand in your application, but come anyway! You will be welcome, and I know will enjoy meeting and talking with men

in your business from different parts of the country.

The year 1919 and several following, I cannot but believe, are going to be boom years for us. Let us then establish a record for fair dealing with each other, so that all can make the reasonable profits to which each is fairly entitled.

What are fair profits in the stone business? Volumes could be written in answer. I believe the business should return not less than 10% per annum on the net investment after charging off reasonable amounts for depletion and depreciation. These latter

should not be merely book entries —they should be cash in the bank or marketable securities, so that you will not fool yourself when your rock deposit is exhausted or the plant worn out; you should have the cash intact to liquidate promptly and return to your stockholders the cash they originally invested. Aim to accumulate a surplus to tide over slim years so that a fair rate of dividends may be steadily maintained. A stock that does not pay fairly regular dividends is not thought much of by investors. It consequently is poor policy for a corporation, whose stock is owned largely by the public, to put all of its earnings back into the business. If you pay divi-

dends regularly you can always get more capital for enlargements and betterments.

These thoughts may be idealistic, but they are what I would like to see every operator obtain. They are obtainable if all will practice the golden rule a little more and adopt the policy of "live and let live." No one can do all the business in his locality. I have been at it thirty years, gone through all kinds of cut prices, slim years and good years, and I have always observed that no matter whether prices are high or low, much business or little, everyone seemed to do about his usual

Cut prices never have and never will increase the volume of business to any extent.

Come to Buffalo February 11 and 12 and get acquainted; you are going to be welcome.

A. J. BLAIR,

President, National Crushed Stone Association.

# ANNUAL MEETING TOPICS

National Crushed Stone Assn.

ALL AGREE Buffalo meeting must be a winner. It must be of such value that every stone man will sure make more money attending it than he will staying away. Subjects proposed for shop-talk.

1. Reduction of freight rates; fair price for ballast.
2. Open price system of competition; anti-trust law.
3. Production cost and cost keeping to govern prices.

4. Standard stone sizes as a profit source.

5. Welfare work; personal comfort of employes; bonus system; piece work; wage scales, etc.

National Association as clearing house to dispose of surplus machin-ery and operating equipment.

7. Increasing profit by decreasing expenses; hints worth \$100 each. A. P. SANDLES, Secretary.

# Standard Sizes of Crushed Stone\*

From the Standpoint of the Producer

By R. W. Scherer

Secretary, Wisconsin Crushed Stone
Association

THE movement to standardize commercial crushed stone sizes, inaugurated by engineers of the Bureau of Public Roads, should be and will be heartily welcomed by crusher operators. The demands as suggested by Messrs. F. H. Jackson, Jr., and C. W. Mitman in their article in the June number of "public Roads," (ROCK PRODUCTS Aug. 14, 28 and Sept. 11) far from being stringent are rather too lenient. Economic plant operation is not the producers' only interest in the matter. They should be and generally are equally interested in the results from the type of construction involved and will be found willing to sacrifice economic operating to a considerable degree to gain better results.

It is difficult to see what a further survey of the screening practice and study of the nomenclature will do to clear up the situation. One could not expect to arrive at a typical set of screens by counting noses, nor by finding a majority of installations that are alike to which the minority would conform. It is also to be regretted that the investigators found it "impossible to record the rate of feeding the stone into the screen." That the nomenclature was in a condition of "confusion worse confounded" needed no demonstration.

### How Product Varies

To define a grade of stone all are agreed that size of screen openings through and over which the material passes must be stated. When these are stated the product may still vary from several causes.

First—There is an appreciable difference in the product of round and square perforations. A hole described as 2 in. square will pass a larger stone than a round one 2 in. in diameter. Square perforations are still used, though to a very small extent except in fine screens. It would be safe to confine the question to circular holes; where square perforations are retained they must be made the equivalents of circular openings.

Second-It makes a noticeable difference in the product whether screens are stationary or revolving. On a stationary screen the stone particles slide over the surface; they are held on their longest dimension. In a revolving screen the stones roll and can and do go through holes no larger than their smallest dimension. The difference in size of product is so great that the stationary screen will retain 20 to 40 per cent of material that has been passed through a revolving screen of the same size perforations. This means that the specification still retained by some engineers-naming the largest dimension as the determining one is not practicable, since stationary screens are almost unknown in the industry. If engineers knew this, they might discontinue the practice. They could guard against "slivers" by other means.

Third—It makes a difference, of course, whether a screen of any type is overloaded or not. More often it is the large plant that has inadequate facilities for separating the sizes. Fines are carried over to the next section having larger openings. Thorough screening should be understood in designating sizes and how thorough it should be will be discussed in another paragraph.

### Nomenclature

Now then, to get clearness in the matter of describing sizes. Let us describe a given product at least technically by the size of perforation which it passed through and the size of perforation that held it and let us understand thoroughly that the figures are for a round perforation, for a revolving screen, and for a screen of sufficient capacity for the plant.

And if we can best describe a given product by maximum and minimum smallest dimension, for technical purposes, why not for all purposes? Why should there be the conflicting nomenclature of numbers and more or less descriptive names. In fact, dimensions are the one description that now are universally intelligible, and it would seem that for all practical purposes, ordering stone, specifying, invoicing, and all, it is just as easy to refer to 2-1 in. stone as it is to write or talk about 23 or medium fine stone.

Probably the best established and most universal system of nomenclature is that of the granite crushers both East and West where No. 1 stone is always very nearly 2½, 1½, and ½-in. and finer called No. 4. It would be very difficult to accustom the granite trade to another system of numbers, while they could be led to adopt the figures limiting the sizes.

# Limiting the Number of Grades

Once we have means of describing grades of crushed stone and it would seem that with the above understanding—2-1 in. stone or any other size would mean the same thing everywhere—a further understanding could be arrived at between the producers on the one hand and road builders, engineers, and architects on the other hand as to grades that should be offered by the former and demanded by the latter.

The advantages to the crusher operators,

if the number of grades can be reasonably limited, are manifest. There can be no question that there has been on the part of engineers-less of road engineers than of the specialists in structural concreteconsiderable academic dogmatism about sizes for certain purposes—they have been just "finnicky." But-and this is from the quarryman's standpoint as well as the engineer's-results must be considered. It is to the quarryman's interest-and some of them can see it-to furnish just the size that will give the best results. It is incumbent on all parties interested to ascertain how much of this fastidiousness is justified and how far the results in road or concrete are affected by a slight variation from the size demanded by some engineer whom the quarryman thinks pe-

### The Demands of Engineering Practice

Here are some thoughts from the standpoint of the quarry operator who is interested in results, which it is hoped may illuminate the subject. On the one hand, some paving engineers, using stone in a special process of asphaltic concrete paving, have insisted on a product passed through a screen one-eighth inch larger or one-eighth inch smaller than was commercially produced. This seems to be pedantry that passes for scientific aggregating. In stone above 1 in., one-eighth inch more or less can make no possible difference; even a quarter-inch variation seems unreasonable in 1-in. and larger stone. The demand for such variations can be eliminated.

On the other hand, quarrymen are at fault when they fail to recognize the imperative necessity for good screening. And here is where they should consider results. Stone for macadam must be distinguished from stone for concrete, and differently prepared. It makes no difference what the hardship on the quarrymen may be, results to a certain extent justify the sacrifice.

The distinction can be simply stated in this way: In macadam stone there must be a large percentage of voids, while in concrete stone the percentage must be as low as possible. To elucidate, no road builder can bind a crusher-run stone. Fines, when present in coarse stone, close the interstices and prevent the entrance of the binder even when that binder is hot tar. How much more must these fines prevent the entrance of stone screenings in water-bound macadam. In penetration macadam, road builders have had to discontinue the practice of dumping loads of the top course stone on the base, because as the load is spread with shovels the "fines" remain on the spot. The stone "mats;" the binder, instead of covering each stone, spatters on the mat;

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<sup>\*</sup> September "Public Roads," published by Bureau of Public Roads, U. S. Dept. of Agriculture.

the binder does not anchor in the body of the course, and a bald spot results. A large percentage of failures of "poured macadam" is due to poor screening. Fines should not be tolerated at all. The engineers of the Bureau of Public Roads suggest a maximum of 15 per cent, but 10 per cent should be the limit; 0 per cent should be aimed at.

There is no "finnickyness" about demanding good screening for macadam. Not only should the fines be removed but the range of sizes in any one grade should be restricted as much as possible for macadam stone and be made as wide as possible for concrete. Thus, for macadam top course, 2-1½-in. stone is better than 2-1 in. The former being more even sized has more voids, and voids are what is wanted.

# Screening Concrete Aggregates

On the other hand, concrete aggregates must have a minimum of voids; the greater the range of sizes the better the results. Stone ranging in size from 2 to 1½-in. has 50 per cent of voids. To make a dense concrete, one-half of the concrete must be mortar, or a mixture of cement and fine aggregates. Well-graded stone ranging in size from 2 to ¼ in., when intimately mixed, has 35 per cent of voids or less, leaving just that percentage to be filled with mortar. The efficiency of the cement in the latter case is increased from 35 to 50, which means over 40 per cent.

The proofs for this are abundant. Whenever and wherever coarse aggregates have been tested for the compressive strength of the resultant concrete the well-graded samples have stood the highest tests. In fact, from the vast number of experimental tests of fine aggregates, in which investigators all over the world have used three sizes designated as fine, medium, and coarse, plotting their results on what is known as the Feret triangle, it is evident that 70 per cent of the largest size permissible, 20 per cent of the medium, and 10 per cent of fine results in the best concrete. Why should not engineers insist that not less than 25 per cent nor more than 50 per cent of, say a 2-1/4-in. concrete aggregate shall pass a 1-in. ring and why should not quarrymen be prepared to furnish it?

# When Concrete Is a Failure

Again this is not pedantry. Why? A concrete made of all 2-in. stone and an ungraded sand is an absolute failure, it is full of voids and can be worked only with a detrimental excess of water. A great deal of similar concrete has gone into bases of pavements and it is to be wondered at that there are not more failures. This specification would be no hardship on any crushing plant. It is not necessary that the two or three sizes required be mixed in a bin; they can be loaded on the cars or trucks, one over the other and would be mixed in unloading, at least in the case of cars unloaded by shoveling. Mixing in bins is undesirable for another reason; a bin full of mixed sizes does not stay mixed. There is

the well known separation by gravity, the large pieces always rolling to the outside of the pile. If the bin is large enough a rather close separation can be obtained by gravity.

# Must Take Concessions

These, then, are concessions which quarrymen must take for the sake of results, thorough screening in macadam stone and thorough mixing in concrete stone, both within reasonable limits. That state testing engineers and chemists are willing to concede the ridiculous fractional sizes is apparent from their preliminary report. (Department of Agriculture Bulletin No. 55.) They recommend the following screen perforations: 3, 2, 1, 1/2, and 1/4-in. The nomenclature proposed consists of the numbers 3, 2, 1, 1/2, and 0, corresponding to the largest size contained in the grade. Thus No. 3 stone is 3-2 in. Combinations of the numbers are proposed; thus No. 1, 2, 3 means a mixture of 1/2, 1, 2, and 3 in. From the fact that this system of designating grades is the very contrary of the only system that has been at all firmly established in any branch of the industry, that of the granite quarries, it does not seem likely that its adoption universally could be successfully urged.

### A Logical System

The logical system of describing grades seems the only one which we could hope to see adopted, that of specifying the limiting sizes. In this system stone for macadam base course would become 3-2 in. instead of No. 3 as is proposed, or instead of "ballast," "macadam," "2-in. stone," or "3-in. stone," as is now the confusing practice in different localities. Stone for cement concrete wearing surface would be simply 2-1/4-in. instead of No. 12, as is proposed. One-half in. screenings would become "1/2 in. and finer." There can be no doubt that the nomenclature would be universally intelligible and, with the restrictions mentioned above, would be ac-

The First Conference of State Testing Engineers and Chemists evidently considered only road work; the requirements of structural concrete must be considered and this will probably add another screen and grade—1½-in. round perforations. This will not be seriously objected to by crusher operators, 2—1½-in. stone for second course macadam will give very much better results than 2—1 in. For concrete 1½-½-in. material is vastly better, is as easily worked and will be more acceptable even for re-enforced work than 1—½ in.

### Standardization Desirable

The adoption of standard sizes is possible. The action of the Bureau of Public Roads in inaugurating a movement to bring this about is to be highly commended. Their engineers have shown a disposition to meet the producer more than half way. If, in addition, other interests are considered, possibly the American Society for Testing Materials, the quarryman who has

conformed his screening plant to the standards prescribed, would have the highest engineering authority to protect him from the whim or caprice of pedantic road builders and engineers, and other engineers on their part, would be assured of getting what they specify. To recapitulate:

I. The establishment of standard sizes of crushed stone adopted throughout the States is possible and highly desirable.

II. To accurately define a grade of stone, screen perforations, through and over which it passed should be given. It should be universally understood that (first) circular perforations are meant, (second) that the screen is a revolving one, and (third) that the screening plant is adequate so that any one grade shall contain not more than 10 per cent of fines (possibly 5 per cent) and not over 5 per cent oversize by laboratory tests and that (fourth) a mixture of various grades such as 2-14-in. shall contain not less than 25 per cent nor more than 50 per cent of "fines" passing through a 1-in. screen, that is, through perforations having one-half of the diameter of the maximum sizes permitted in the mixture.

III. The following screen sections are proposed: 3, 2, 1½, 1, ½, ¼ in.

IV. The nomenclature should be the logical one, simply stating maximum and minimum sizes.

(As pointed out by Mr. Scherer, any movement to standardize sizes and nomenclature of crushed stone products should be and probably will be heartily indorsed by the industry. In fact, the survey of present practice so far compelled by the Bureau of Public Roads would have been practically impossible without the co-operation of the operators concerned. Although Mr. Scherer can see no reason for any further survey of present conditions, the Bureau of Public Roads feels that such a survey is not only desirable but necessary before final recommendations can be made which will be generally acceptable.-Editor of "Public Roads.")

# Florida Will Spend \$6,000,000 on Roads

JACKSONVILLE, Fla.—The amount that will be expended in Florida for new roads and bridges in 1919 will be over \$6,000,000. Most of this money has been appropriated already and bond issues for hundreds of thousands of dollars have been voted upon and bonds sold. Many of these plans and the issuance of the bond issues date back to 1917 to a time antedating the entrance of this country into the war.

When the armistice was signed the state road department, county commissioners and others interested in good roads dug into the files and are now considering pushing work to begin in January. The state road department has available now more than \$3,300,000 for road purposes. This does not include the moneys appropriated by counties.

, 1919

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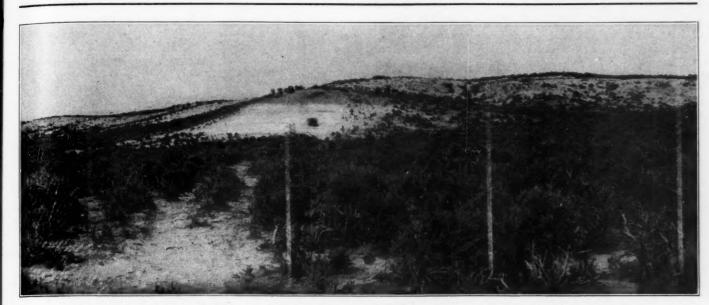
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General view of Elko, Nevada, deposit of diatomaceous earth, purest in United States, 98 per cent silica

# Developing Western States' Deposits of Diatomaceous Earth

Deposits of Kieselguhr in Salt Lake District of Exceptional Quality Give Rise to New Industry

BY the curtailment of shipping facilities, thereby reducing imports to a minimum, the world war has worked a serious hardship on many American industries. The severance of friendly relations with certain European governments made acute the already serious condition of such industries. Some of the much needed imports were finished products employed extensively in industrial circles, while others were in the raw state and necessary to the manufacturing industry of the country.

Because of the wide difference in production costs American industries had found it impossible to compete with those of Europe, and an incentive to research, exploration and development in many lines had been lacking. Where production costs were so favorable abroad the activity in these directions were stimulated to an exceptional degree, and the formulae and processes evolved were guarded with the utmost secreey. So carefully were some of the processes protected that in some instances foreign concerns were able to develop American resources and produce their commodities without local competition.

# Salt Lake Gets New Industries

Although the situation thus created is uncomfortable, to say the least, it is not without its compensations. Confronted by necessity, and stimulated to the extreme by the attractive prices, Americans are devoting themselves to lines of research, ex-

By O. J. Grimes

ploration and development long neglected, with a view to putting this continent on a basis of commercial and industrial independence. In this great era of exploration and development the West is destined to play a prominent part; its resources have only been scratched by explorers, and development is scarcely beyond the embryonic stage. What it may mean to the intermountain region is suggested in the establishment during the past month of two new industries in Salt Lake.

In the old warehouse of the Bamberger interurban railroad, on Third West-st the Insulation Manufacturing Co. has established a plant, temporarily, for the manufacture of diatomaceous earth products. The chief aim of the concern at this time is the reduction of fuel and ice bills. Out in North Salt Lake the Utah Wall Tint Co. has installed a plant for the production of mineral paints, some of which are reported to excel the finest imported products. The raw materials in both instances are obtained from Utah and neighboring states.

Diatomaceous earth, more commonly known as pure silica, has been found in various parts of the country, particularly in the West. A few deposits have been discovered in Utah which, like those of most other sections, are of an inferior quality. The only deposits of record in this country, which are of sufficient purity to be employed as high grade insulating material, are in California, Nevada and Idaho, and the only American concern, besides the one in Salt Lake, utilizing such a deposit is operating at Lompoe, Cal.

## Process Once German Secret

Prior to the world war the California concern was known as the Kieselguhr Company of America. Kieselguhr is the German name of this particular form of mineral earth, large deposits of which exist, and prior to the war were developed, near Hanover, Germany. The California institution now is known as the Celite Products Co. The processes for utilizing diatomaceous earth for insulation purposes originally were worked out in Germany and were among the carefully guarded trade secrets of that country.

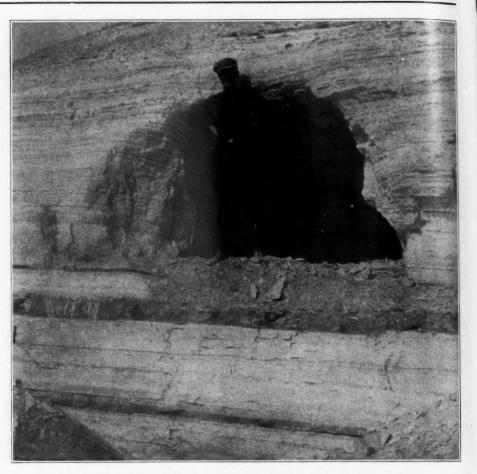
What is probably the purest deposit yet reported in the United States is situated near Elko and is better than 98 per cent silica, according to analyses. It contains only a trace of iron and alumina. Another deposit analyzing about 97 per cent silica has been found near Fairfield, Idaho, and another of high grade less than a mile from Glenn's Ferry. Holdings in these three districts have been acquired by the Insulation Manufacturing Co. of Salt Lake City.

The extent of these deposits is yet to be

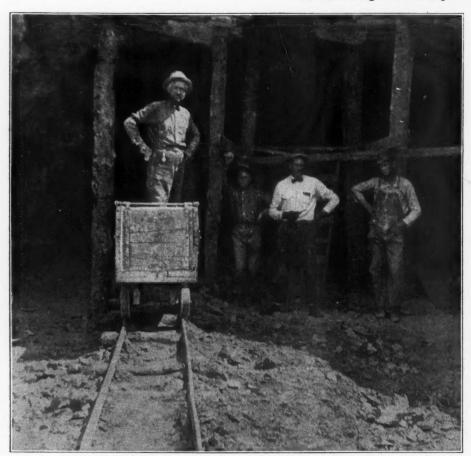
demonstrated, but the development work done so far indicates that the supply of diatomaceous earth of high quality is practically inexhaustible. West of Elko it is exposed in a big ledge in one place and at other points test holes put down show that the overburden varies from a few inches to several feet. That it goes to a depth of more than forty feet is indicated by a shaft, and tunnels 40 to 75 ft. long have failed to reveal the limits of the deposit. It is probable that the company will undertake its biggest development here, but some work is being done on the Fairfield deposit.

### Is One of Best Non-Conductors

The principal use which the local concern plans to make of the product is insulation against heat and cold, or to conserve them, if you please. By science it has been accepted as one of the most efficient non-conductors of heat and cold yet discovered, and it is insoluble in water or acids. The one product which excels as a non-conductor, according to the United States Bureau of Standards, is calorox, which is too expensive to be exploited extensively in a commercial way. The thermal conductivity of calorox is given as .000076 of 1 per cent; cotton wool .0001; corkboard, .000106; asbestos air cell, .000154; infusorial earth, .0001. The thermal conductivity of cotton wool and corkboard, however, apply only to cold, and asbestos only to heat, while that of in-



Tunnel in ledge of Elko deposit of Insulation Manufacturing Co.



Mine of Insulation Manufacturing Co., near Fairfield, Idaho

fusorial earth applies to both heat and cold. Numerous tests made indicate that diatomaceous earth will stand a heat of 2930 deg. F.

The deposits are made up of myriad microscopic fossils, so minute that it is estimated there are approximately 41,000,000,000 air cells to the cubic inch. These countless air cells are responsible for the qualities of the product as a non-conductor and permit the crushing of the material to a powder without impairing those qualities. Mining Goes On Only in Summer

The material, as it occurs, carries about four times its own weight in moisture, which must be removed before the product can be utilized for insulating purposes. With the moisture removed, the material weighs about thirty pounds to the cubic foot in a solid state, and about twelve pounds to the cubic foot when crushed.

Because of the heavy moisture content of the product in its raw state it has been found impracticable to carry on mining operations during winter months. The material is broken down during the summer and cut into blocks or slabs and stacked in the sun for drying. While it can be dried by artificial heat, the process is so expensive as to be prohibitive. The wind and sun will accomplish even better results than artificial heat, but the drying operation occupies anywhere from two weeks to two months, depending upon weather conditions. The company plans to mine suffi-

nd nat of Pit of Diatomaceous Earth in the Salt Lake District and the Drying Operations



Quarry working near Fairfield, Idaho, showing ledge; Insulation Manufacturing Co. of Salt Lake City



Drying mined product by sun and wind; this takes from two weeks to two months before shipments can be made

cient material during the summer to supply its needs throughout the year. By drying the product at the mines, not only are better results obtained, but the freight charges are materially reduced, approximately twenty tons filling a 100,000 capacity covered car to the roof. The dried material is to be stored at the Salt Lake plant for use as needed.

Before being utilized the product is ground to a powdered form: in this form it can be poured between walls, on ceilings, on boilers for jackets, or used in any manner where there are two supporting walls. One of the products to be manufactured by the local company, however, is Sullivan block. The ordinary Sullivan block weighs about fourteen pounds, while that made of diatomaceous earth weighs about ten, reducing the weight of walls materially. The strength of the diatomaceous earth block is sufficient to carry approximately four times its own weight, but in its construction it is necessary to use a binder of plaster of Paris or a similar

# Potash Developments at Searles Lake

SAN FRANCISCO—C. A. Zabriskie, head of the Boro-Solvay potash plant at Searles Lake, in Southern California, says the company is now producing 800 tons of potash a month, which is being sold for \$120,000, or \$150 a ton.

This is the next largest to the plant of Lord Brobourne of London and Baron von de Bopp of New York and San Francisco, which is turning out 1,200 tons a month, valued at \$180,000.

Additional plants are to be erected at the lake on five leases recently given by Secretary of the Interior Franklin K. Lane. Three of the five lessees are as follows:

F. M. (Borax) Smith of Oakland.

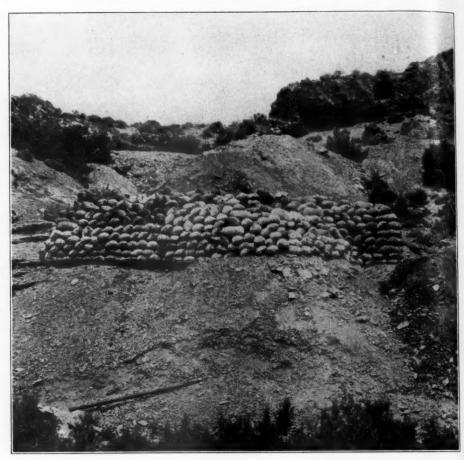
W. W. Chapin of Oakland, and a Boston syndicate.

The Nevaad Chemical Co. of Victor Barndt, and a Philadelphia syndicate.

# Nebraska Potash Plant in Bankruptcy

A LLIANCE, Neb.—The Commonwealth Potash Co., which erected a plant at Boness lake, near Birdsell, seven miles from Alliance, at a cost of \$35,950, last summer and found after one carload of potash salts was produced that it contained too low a percentage of potash for commercial use, has gone into bankruptcy. Creditors' claims amount to about \$10,000. The company had been incorporated for \$50,000 of which \$39,550 had been paid in.

The lease on the 12-acre lake was taken and the plant erected after W. A. Norris, it is said, reported the surface water solids as running from 1 to 14 per cent, and the potash content in the solids from 22 to



Shipment of yellow ochre from Gunnison deposit, awaiting movement to mill in Salt Lake

27 per cent. Samples were taken by Norris and the analyses were made by another.

Analyses made of the first car-load of product showed such a low percentage (6 to 8 per cent) of potash in the finished salts that operations were stopped immediately and the officers of the company, President Lawrence Farrell, the largest stockholder, and Secretary Verne Hedge, promptly filed the petition in bankruptcy to protect the creditors. Mr. Hedge has not been able to explain the discrepancy between the tests but things the first tests were "accidentally wrong."

It is a well built plant and will probably be sold to another company of neighboring lake whose product has commercial value. F. A. Crites of Chadron, Neb., is referee in bankruptcy.

# Big Phosphate Plant for Tennessee

OLUMBIA, TENN.—Construction work on a large phosphate plant and auxiliary factory town is in progress near the Century Mines, Maury county. The site selected is said to contain some of the richest phosphate land in the state and



probably in the United States.

The project is extensive and seems to provide for every contingency that may arise in the conduct of a factory. It includes complete washing, drying and grinding equipment, power house and machine shop. The best information obtainable here is that the plant is being constructed for the J. Ogden Armour Fertilizer Co. of Chicago.

The work is considerably advanced, twenty-six houses having been erected already for employes. The plans call for a storage bin house in one structure, 130x20 ft. and 58 ft. high with a wing, the power house 90 ft. square and 40 ft. high; a double dryer, 38x90 ft. and 40 ft. high; a bridgeway connecting storage house and dryer, 60 ft. long and 58 ft. high; a wet rock bin, 40x60x48 ft. (height); a washer 122x60x75 ft.; a skipway 190x65 ft.; machine shop, blacksmith shop, wareroom and office building.

Electricity will be employed in the operation of the works and also for lighting. The power plant is provided with four large boilers, several electric generators and about 25 electric motors. Cars may be loaded directly from the storage house, which adjoins the railroad tracks. The contractor for the wood work is N. F. Vaughan of Columbia. The superintendent of construction is W. L. Kaiser, Chicago.

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# Foundry Molding and Facing Sand

# How Foundry Sand Is Tested-Essentials of Good Foundry Sand

By R. F. Harrington

THE selection, blending and reclamation of molding sands, has, I believe, within the past few years, received considerable impetus, especially in the automobile industry. This is due, I believe, to the increasing necessity of obtaining more uniform sand, better prepared facing or heaps, and a great tonnage of castings produced per ton of sand used.

Under normal times too great stress cannot be laid upon the importance of carefully selecting the proper sand for the work at hand, and insisting that the material be uniform, insofar as the bond and grain size is concerned. I have found it entirely possible to so co-operate with the sand producers, as to obtain these conditions.

I heartily recommend frequent visits to the banks, upon the part of the foundry foreman, or user of the sand, in order that he may become better acquainted with the conditions under which molding sand is produced, and likewise be in a position to make reasonable demands, so far as quality of the material is concerned. A few properly selected samples of sand, as seen at the different banks obtained for further test, will then allow one to select the sand best suited for the work.

## Dye Absorption Test

The (most important) tests which I would recommend in this connection are the bond or dye-absorption test and the sieve test. These tests are conducted primarily the same as originally suggested by Dr. Moldenke, and later revised and improved upon by Messrs. Saunder and Hanley, of Providence, R. I., as outlined in their paper before the Atlantic City Convention of 1915.

Below is noted results of dye-absorption test, mechanical analysis and transverse test on a shipment of Jersey sand, a laboratory facing mixture, and a shipment of elay.

| •                                  |                                  |                     |
|------------------------------------|----------------------------------|---------------------|
| Green Jersey<br>Shipment<br>5/3/16 | Laboratory<br>Mixture<br>2/23/17 | Red Spotted<br>Clay |
| Bond No. 576                       | Bond No. 466                     | Bond No. 3050       |
| Mesh Percent                       | Mesh Percent                     | Mesh Percent        |
| 20 8.46                            | 20 15.28                         | 240011 2 01 0911    |
| 60 18.70                           | 40 22.80                         |                     |
| 40 19.12                           | 60 17.00                         |                     |
| 80 9.26                            | 80 7.36                          |                     |
| 100 4.70                           | 100 3.40                         |                     |
| 150 7.26                           | 150 5.20                         |                     |
| 200 3.00                           | 200 1.04                         |                     |
| 200 13.24                          | 200 11.52                        |                     |
| Clay Sub-                          | Clay Sub-                        |                     |
| stance 16.26                       | stance 16.40                     |                     |
| 100.00                             | 100.00                           |                     |
| Transverse                         | Transverse                       | Transverse          |
| Strength                           | Strength                         | Strength            |
| - grams                            | 220 grams                        | 1720 grams          |

For those not familiar with the tests as described by these gentlemen, I would point out that the bond test as conducted consists of subjecting a given weight of

\*Extract from a paper read at September meeting of the New England Foundrymen's Association.

the new molding sand, facing or heap sand, to the action of a so-called deflocculating agent, whose function is to break up the sand conglomerates, separating the clay and sand particles in such a way as to allow more intimate contact with the dye-solution, which is later added. Agitation with the deflocculating agent and the known amount of dye is brought about by standard shaking apparatus.

After allowing the suspended particles to settle, the amount of dye which remains unabsorbed is measured either by comparison of the depth of color of the supernatant liquid with the depth of color of a standard solution by means of color comparison tubes or by dyeing skeins of cotton yarn with the unabsorbed dye solution followed by comparison with standard cotton skeins.

Thus, by obtaining the difference between the amount of dye unabsorbed and that originally added we are able to arrive at the amount of dye actually absorbed by the active clay substance present, whether it be the active clay substance in the new molding sand, facing sand, or clay. The result is usually expressed as the milligrams of dye absorbed by 100 grams of sand, the bond number varying in the case of sand from 300 to 1,200 and in the case of clay from 1,700 to 5,000.

### Sieve Tes

The sieve test consists of subjecting a known weight of sand to the action of a deflocculating agent as in the bond test and then separating the various sized grains by collecting them on sieves of 20, 40, 60, 80, 100, 150 and 200 mesh. Since all the clay substance and some of the sand grains are smaller than 200 mesh it is necessary first to transfer the sample to the 200 mesh sieve and wash with a stream of water. The sand particles passing through the 200 mesh sieve, which are termed 200 plus mesh, are separated from the clay substance by allowing the sand grains to settle and the solution containing the suspended clay particles is then decanted.

The residue collected on the 200-mesh sieve is then transferred to a dish, the sieves stacked, and the residue transferred to the upper one. Washing is continued until the particles have been retained on their respective sieves when they are dried in an air bath and weighed. As stated above, the weight retained on each sieve is recorded as the per cent of fineness. The amount of clay substance is then determined by obtaining difference between the

total 100 per cent and the sum of the per cents retained on the sieves.

# Co-operation with Producer Urged

Having obtained these tests, not upon one but upon many samples, the foundryman is in a position to determine that bank which provides the richest sand consistent with proper texture and therefore most efficient sand for his work.

Now as to what can be expected under these very abnormal times, when molding sand banks formerly available for boat shipment are now closed because of inability to obtain bottoms, and poorer banks have of necessity had to be opened where rail shipments could be made. Again I would suggest a visit to the banks in order that conditions may be realized and closer co-operation obtained between producer and consumer.

### Variations in Clay

I have referred to the active clay substance, and in order to make clear exactly what is meant by this term I will take, for example, two mixtures of sand as illustrated below. One mixture contains 95 pounds of silica sand of a definite mechanical analysis and 5 pounds of Jersey clay. It is designated as mixture A. The other, designated as mixture B, makes use of 95 pounds of the same silica sand but instead of five pounds of Jersey clay, makes use of five pounds of flinty clay. The former, or the Jersey clay, being rated as 100 per cent fat by the Geological Survey.

| Constituent per cent 95 Silica No. 1 5 Clay (Woodbridge) | Bond No. None 5000      | Bond<br>Contribution<br>250 |
|--|-------------------------|-----------------------------|
|  | Total Bond<br>Mixture B | 250                         |
| Constituent<br>per cent                                  | Bond No.                | Bond<br>Contribution        |
| 95 Silica No. 1<br>5 Flinty Clay                         | None<br>2500            | 125                         |
| 5 Flinty Clay  | 2500                    | 125                         |
|  | Total Bond              | 125                         |

A mechanical analysis of these two sands would show in both cases 5 per cent of clay substance. Yet in one instance we would have a bond test of 250 and in the other a bond test of 125. This, of course, is due to the fact that the Jersey clay shows a bond test of 5000 as compared to a bond test of 2500 in the case of the flinty clay.

# Test for Distribution of Clay

The dye-absorption test fails to serve as a means of inter-comparison, in that the test tells merely the quantity of active clay substance present and not the manner in which that clay substance is distributed. Therefore, the bond test must not be used as a criterion by which to jduge the quality of facing sands or heap, but must be used in conjunction with the other tests.

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The proper distribution of the bonding materials is equally as important, insofar as its effect upon the strength of a sand is concerned, as is the proper distribution and character of the graphite on the strength of cast iron. As a means of determining the effectiveness of the mixing operation, I am of the belief that the transverse strength test as made upon bars 6 in. long. and 1 in. square in cross section is the best.

# Contracts in Restraint of Trade

The Law Regarding Agreements Between Competitors

T HAPPENS quite frequently that when I an established business is sold the good will and trade name of the business are also included in the purchase price. The purchaser, in order to safeguard his interests, requires the seller to sign an agreement which specifies that he will not engage in a competing business within certain territory and for a given time. Such an agreement is known as a contract in partial restraint of trade, and if the terms of such a contract are not unreasonable it will be upheld by the courts. There are, however, some business men who confuse this kind of a contract with another kind, known as contracts in restraint of trade: and acting on their own interpretation of the legal principles involved they violate their agreements, thinking that even partial restraint of trade cannot be enforced by the purchaser.

# Good Will Most Important

In many instances the good will of a business is one of the most important assets, and the purchaser of this good will has a legal right to protect himself. He may not, however, make unreasonable and unjustifiable demands of the seller, or impose conditions which would not benefit the purchaser. Thus, where the purchaser of a business, which is purely local, being confined to a certain city, should ask the seller to agree not to again engage in a similar business in that state, such an agreement would not be valid, because it would be unreasonable and in restraint of trade. But if the purchaser should demand of the seller not to engage in a similar business within the territory affected, and within a certain time, such an agreement would be valid and would be in partial restraint of trade only.

A case of this nature was decided quite recently in one of the higher courts. In this instance the seller disposed of his real estate, business, trade name and good will. He also entered into an agreement with the purchaser that he would not, for a period of two years from the date of the sale, within the same city; and for a period of five years, within a radius of two miles from this place of business, be or become directly or indirectly engaged in or connected with any similar business, either individually or as a member of a partner-ship, employee or stockholder of another company.

Three years after the date of the agreement the seller, Johnson, rented a property

about two miles from his former place of business and started to equip this property for a business of a similar nature. In this he was entirely within his rights. However, immediately upon again entering in business he began to advertise extensively by various methods and to solicit business within a radius of two miles from his former place of business. In doing so he thought he was acting within his legal rights, because he construed the terms of the agreement as merely prohibiting him from establishing his business within certain territorial limits, but which did not prohibit him from soliciting business within the prescribed area.

# Newton's Contentions

Newton, the purchaser, however contended that Johnson was violating the agreement by doing business within the territory mentioned and asked the court for an injunction to restrain him from soliciting any further business in violation of their agreement. The court upheld Newton's claim and granted an injunction against Jchnson. In doing so the court expressed the following opinion:

"We are of the opinion that it is a breach of the agreement to conduct a business similar to the one transferred within a radius of two miles, or to do acts in violation of the spirit and intent of the contract. The defendant cannot be restrained from establishing a similar business, after a period of two years, beyond the territorial limits set forth in the agreement; but the soliciting of business, the selling and delivery of goods to customers within the territorial limits is carrying on business and a breach of the contract.

"We need not concern ourselves as to the motive or reason actuating the minds of the parties to the agreement as to the limitation of time or territory as therein set forth. As we have already stated, the purpose and requirements of the agreement are perfectly clear, and we cannot read into the agreement any mental reservation or mutual understanding not therein expressed at the time of execution."

The greater number of contracts in partial restraint of trade arise in the sale of what is known as the good will of a business. The purchaser of an established business assumes that the people who traded there will continue to trade there, irrespective of changes of ownership, and this likelihood is known as the good will of

the business. But when the purchaser executes a contract of this nature he should be sure that it is reasonable, that it does not impose conditions upon the seller which are of no benefit to the purchaser; for if the contract is unreasonable the courts will probably declare it void, leaving him without any protection.

For instance, the purchaser of an established business in an eastern city had the seller agree not to again engage in this kind of business at any time. The court held that the contract was illegal, being in unreasonable restraint of trade. The restriction imposed upon the seller was uncalled for and unnecessary to protect the good will of the business.

The important thing to bear in mind when making contracts of this nature is that a reasonable partial restraint of trade is usually legal, while an unreasonable restraint of trade is always void. Just what is a reasonable restraint is, of course, a question for the courts to decide; but if the purchaser does not impose upon the seller greater restrictions than are necessary he can feel assured that he is amply protected.

(Copyright by Ralph H. Butz)

# Allied Belting Co. New Coppock Enterprise

TOLEDO, O.—The Allied Belting Co. is the newest enterprise in which F. D. Coppock, of the Greenville Gravel Co. has embarked. The company which was recently incorporated in Ohio has begun the manufacture of canvas stitched belts for conveying transmitting and elevating purposes at 2929 Dorr street, Toledo, O. The plant will be in full production by January 1.

Mr. Coppock is president and S. C. Haines, vice-president and manager. Mr. Haines was formerly with the Main Belting Co. of Chicago, from which he resigned last October.

# West Virginia to Spend \$18,-000,000 on Roads

MORGANTOWN, W. Va.—A. D. Williams, State Road Commissioner, announces that the expenditures for road work in that state may run as high as \$18,000,000 in 1919. This estimate is based on actual money either in hand or receivable through Federal Aid, county levies and bonds authorized by the people and automobile taxes.

The Federal Aid allotment is \$531,000; automobile taxes, \$1,100,000; main county levies laid by courts for 1918, \$1,955,000 (\$2,000,000 more expected in 1919 levy); class B fund for county roads, about \$4,000,000; other county and district bonds voted by the people and still to be expended, \$9,500,000.

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# Use of Lime in the Tanning Industry

Probably One of the Most Ancient Uses of Lime But One Which May Possibly Be Superseded

THE function of lime in tanning is chiefly in removing the hair from the skin, but we had better enter a little into the technology first to see how it works. The chemistry of tanning is a broad subject and although much has been done, it is not as well developed as that of many other industries. Indeed, there remains a great deal still to be worked out. We have earnest hopes that if we can all get settled down after the war and the quest of knowledge may continue under that reign of order which is necessary to research, great improvements will result in this connection as well as in others from the enlightenment which science promises.

The skins of all animals have many features in common: there is the true skin or derma or corium, which is composed of interlacing bundles of fibres known as connective tissue, cemented together by a substance more soluble than the fibres themselves. In the middle of the skin these fibres are rather loosely interwoven, but they become more compact as they near the flesh underneath and also as they approach the epidermis above it, or rather on the outside.

The under part of the skin is united to the flesh by a network which is frequently full of fat cells and as such it is called adipose tissue. The epidermis or outside layer, is much thinner than the true skin and its interior is composed of cells which become flattened as they reach the surface where they dry up and become the familiar, horny layer which is the real outside of us. This outer surface is constantly being worn or rubbed away and new cells are also constantly flattening to take its place. The epidermis is also called the epithelium.

Hairs start in the epidermis and so do sweat glands, although they extend deep down into the true skin. There are oil glands around each hair and they discharge fat as a lubricant to the hair sheath. Horns, claws and nails are anatomically and chemically analogous to hairs. There is a very fine membrane which lies between the true skin and the epidermis. This forms the grain surface of true leather.

# What the Tanner Does

Now the job of the tanner is to remove the fleshy part from one side of the skin and the hair and epidermis from the other, and to give it such treatment that it will not putrify. He must also beware that it does not become hard and horny. Most of his problems are within the two domains of biological and colloid chemistry—and most of them were solved long before anybody By Ellwood Hendrick,
Of Arthur D. Little, Inc., Chemists,
Cambridge, Mass.

every heard of such things. But because many of the best methods of practice that are available today are older than history, this fact does not make them final and hinding.

Tanning is an art susceptible of great improvement provided research is diligently pursued. As it is, the process is long and tedious and not exactly what a good housewife would call clean. And it is expensive, although the introduction of chrome tanning into this country, in which this laboratory played a considerable part, has made a great cut in the time factor required for tanning many leathers.

In bating, for instance, for certain purposes a bath of water containing pigeon manure is used while for others, as in morocco leather, dog dung is employed. These methods are not universal but they are still in use. Why the pigeon product is desirable for one effect and the dog merchandise for another is unknown except under the general statement that certain bacteriological developments are induced. But if these micro-organisms were adequately known and cultures of them were available, it stands to reason that it would be no more necessary to keep pigeons or to follow around after Rover and old Tray with such earnestness and anxiety.

### Where Lime Comes In

The first thing the tanner does with his pelts is to soak them. For this he needs good, soft water. Next, the skins are "fleshed" which consists in removing fat or flesh which has been left on the inner side. The good old way was to work the hide over a beam with a knife, but nowadays machines for the purpose are usually employed. Next comes depilation which signifies removing both the hair and the epidermis. The oldest method was by sweating, which means allowing the hides to remain in a close, damp place until the thin film which lies between the epidermis and the true skin begins to putrefy, so that the hair becomes loosened and may be easily removed. Great care is necessary lest the hides become injured in the grain. The usual method employed is called liming and that is what we are writing about.

The lime is slaked in the familiar manner and used as required. One of the advantages of lime is that being only slightly soluble in water, an excess added to the bath does not injure the hides. It is necessary to provide a surplus to take the place of that taken up by the hides and a frequent measure is about 10 lbs. of lime to 100 lbs. of hides—which is far and away above the theoretical requirement. Sometimes the skins are laid in the lime water one above the other, sometimes they are suspended in the liquor and sometimes they are shaken up in it, according to the practice favored by the tanner.

### Function of the Lime

The lime produces an alkaline condition of the skin without injury to the fibre. It converts more or less of the fats into lime soap and it softens the epidermis. It also plumps the hide, possibly due to the formation of lime soap, and at the same time it dissolves the cementing material of the fibres which causes them to split up into finer thread-like substances.

For some purposes old limes are used which unhair much more quickly than fresh ones. Sometimes the hides are placed first in an old lime pit and then in a new one. Of course, the main difference between a lime pit that has been used over and over again without change-an old lime as it is called-and one freshly made, or a new lime, is not due to the relative amounts of calcium hydroxide in solution. The old lime contains a large quantity of organic matter, and the older a pit grows the more homelike it seems to become for micro-organisms, for they certainly do increase and multiply. Therefore, there are safety limits to its age, because there is one thing that untanned skins are always ready and willing to do under any conditions that will permit it, and that is to rot.

The next step in the good old days was to put each hide on a beam and to remove the hair and epidermis with a dull knife, but now machines are usually installed for the purpose.

### Getting Lime Out of the Hides

Following this is the process of softening or bating whereby, amongst other
things the plumping and stiffness caused by
the lime is overcome when this is desired.
Here is where the various kinds of dung
come in and of course, once more we must
look out for the rotting of the leather. And
the lime must come out of the skins, because lime is no less than an infernal nuisance in the actual process of tanning which
soon ensues.

As a result of the fermentation, certain bodies are produced which doubtless act as solvents for lime, but that is not enough to do the job completely. Consequently, the skins are next treated by immersion into an infusion of bran which is undergoing lactic fermentation and thus producing lactic acid, which forms soluble calcium lactate and thus removes the lime.

Now comes pickling in which hides are treated in a drum by a concentrated salt solution and a small amount of sulphuric acid and then comes the tanning proper with which we have nothing to do as purveyors of lime.

# Future of Lime Process—Quality Necessary

Of course, every kind of skin and every kind of leather requires its own particular treatment, and there are marked variations from the processes we have indicated. We have merely pointed out certain initial steps to explain where lime comes in and what it does. And we want also to make it clear that while lime may still be used in tanning for a thousand generations, it may be supplanted in the near future. In several tanning processes it is not used, being supplanted by a considerable number of substitutes. Arsenic sulphide and sodium sulphide are used preferably with lime while other processes are proposed which eliminate the beam house methods.

There is so much still to be learned in regard to colloid chemistry and bacteriological chemistry, both of which are tied up with tanning, that it stands to reason that many present methods may soon become obselete. So whether liming will continue as a function of tanning or not, is one of those things that rest in the lap of the future.

### Pure Calcium Oxide Best

In regard to the quality of lime needed by tanners it is lime and not its impurities. Magnesia is not wanted and neither is clay for both upset good control of the processes. Iron oxide, although insoluble, may become mechanically fixed to the grain and be the cause of stains. The nearer the lime is to pure calcium oxide the better it is for this purpose.

# American Cement in Foreign Markets

# Industry in Favorable Position for After the War Business

MASHINGTON, D. C .- While the end of the war leaves most American industries in doubt as to their situation in the foreign field, the cement industry is in an especially favorable position to compete for foreign markets. Statistics obtained by the Washington bureau of Rock PRODUCTS from the Department of Commerce show that the exports of hydraulic cement have fallen off but slightly because of the war while, on the other hand, a new market-Argentine-has been opened up and is already our second-greatest market, being exceeded only by Cuba. The falling off in quantity, however, has been more than offset by increased values so that, while exports so far this year are running, in quantity, about ten per cent below those of 1916, the value is approximately 65 per cent greater.

The statistics secured from the Department of Commerce cover our foreign trade in cement during the first nine months of the current calendar year, as compared with corresponding periods of 1916 and 1917. They show that the exports of cement during the first three quarters of 1918 amounted to 1,761,549 barrels, valued at \$4,428,941, against 1,817,169 barrels, valued at \$3,613,582, in 1917, and 1,980,751 barrels, valued at \$2,894,754, in 1916.

The heaviest consumer of American cement, as stated above, is Cuba, which, this year, took 530,642 barrels, valued at \$1,326,401. This is slightly less than her imports during the preceding years, the totals of which were 666,002 barrels, valued at \$986,839, in 1916, and 647,339 barrels, valued at \$1,307,969, in 1917.

The new market, Argentina, during the nine-month period, took 193,701 barrels, valued at \$482,735. During the month of September, which was light, 16,092 barrels,

valued at \$47,070, were shipped to this market.

Closely following Argentina in its consumption of cement, Brazil this year has absorbed 191,580 barrels of cement, valued at \$433,892, a considerable increase over the total for last year, which was 133,860 barrels, worth \$257,990. In 1916, the total imports of that country were 171,952 barrels, with a value of \$228,010.

Exports to Panama have fallen off considerably. Whereas, during the first nine months of 1916, that country took 525,940 barrels, valued at \$724,490, and was our second largest market, last year the total was but 263,106 barrels, worth \$458,944, and this year it has dropped to 149,782 barrels, valued at \$334,629.

At its present rate of increase, Mexico will soon supersede Panama as a big consumer, shipments to that country having increased from 65,015 barrels, with a value of \$120,996, in 1916, to 84,758 barrels, worth \$212,420, last year, and 103,859 barrels, valued at \$284,453, this year. Shipments to Peru, after dropping from 57,278 barrels, valued at \$85,464, in 1916, to 38,893 barrels, with a value of \$79,420, this year increased greatly, the total being 78,114 barrels, worth \$199,125.

On the other hand, exports to all other countries, of which individual records are not kept, after increasing from 494,564 barrels, valued at \$748,955, in 1916, to 649,213 barrels, worth \$1,296,839, last year, this year fell to 513,871 barrels, valued at \$1,367,706.

Our imports of cement continue to fall off steadily. Figures compiled from reports secured from the Department of Commerce show our imports of hydraulic cement during the first nine months of this year to be only 86,800 pounds, valued at

\$931, as compared with 404,500 pounds, worth \$4,434, during the corresponding period of 1917, and 622,100 pounds, with a value of \$4,058, in 1916. Imports of all other cements have fallen from \$15,159 in 1916, to \$13,023 last year, and \$9,323 this year.

Two Cement Plants Merge in Washington

SEATTLE, Wash.—The stockholders of the Superior Portland Cement Co. Dec. 12th voted to buy the plant of the Washington Portland Cement Co. at Concrete, Skagit County, adjoining the Superior plant. The merger, it is said, will allow continuous operation of the Superior plant and eventually complete operation of both plants.

John C. Eden, president of the Superior company, now becomes the head of both concerns. The president and principal owner of the Washington company, Alfred F. Coats, will retire from the cement business to develop his extensive timber holdings.

# Large Shipments of Cement to Chile

L OS ANGELES, Cal.—The Riverside Cal., has commenced the shipment of 150 carloads of cement from its Crestmore plant to Chile, South America. The total shipment is said to represent a \$200,000 order for material. The Southwestern Portland Cement Co., Los Angeles, Cal., will furnish 5,000 barrels of cement to the municipal power bureau at a cost of \$3.68 a barrel, with 25 cents each rebate for sacks.

# Fixed Prices on Cement to Cease December 31

WASHINGTON, D. C.—At a meeting of the price fixing committee with the cement industry, it was mutually agreed that all prices on cement will expire by limitation Dec. 31, this being notice to the public that the price fixing committee will cease to exercise any jurisdiction over cement prices after that date.

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# Importance of the Limestone Industry Shown by New Statistics

Without That Used for Making Lime and Cement, Statistics Show Three-Quarters of All Stone Quarried Is Limestone

THE VALUE of the limestone produced in the United States in 1917 increased \$4,953,780 (12 per cent), but the quantity decreased about 3,770,000 short tons (6 per cent). The total output for 1917, as compiled from reports made by the producers to G. F. Loughlin, United States Geological Survey, Department of the Interior, was 63,465,000 short tons, valued at \$46,263,379, and represented 76 per cent of the quantity and 56 per cent of the value of all stone quarried in the United States. The average price was 73 cents a short ton in 1917, which was 11 cents more than in 1916.

The accompanying table shows the production of limestone in 1916 and 1917 according to uses. In this table the quantities produced are published for the first time, and in order to make possible a statement of the total quantity produced some of the quantities reported in other units are reduced to short tons.

# More Uses for Limestone

The production of limestone for use in the manufacturing industries was greater both in quantity and in value in 1917, but the increase in quantity for this use was not sufficient to offset the large decrease in building, riprap, and crushed stone, although the increase in the price of all products brought the total value up to an amount greater than that in 1916. The number of active operators in 1917 was 1,465, which was 218 less than in 1916. Many small quarries that supply local markets were entirely closed during 1917, owing to lack of demand, scarcity of labor, and high wages, as well as increased cost of supplies and substitution of cheaper ma-

Forty-four states produced limestone in 1917, two more than in 1916. In 1916 Hawaii reported pulverized limestone sold for agriculture but none in 1917. In 1917 Maine, which reported no output in 1916, reported a small quantity of stone sold to paper mills. Mississippi for the first time reported a small output of limestone, which was pulverized stone for use in agriculture and was crushed at the State Penitentiary at Waynesboro, Wayne County, and at Okolona, Chickasaw County. Nevada for the first time reported stone shipped for furnace flux, sugar manufacture, and other minor uses, from Sloan, Clark County, and from Ludwig and Mason, Lyon County. Of the total producing states 33 increased in value of output. Washington, Rhode

| Use.  | 1916.   |  | 1917.   |  |
|---|---|--|---|--|
| USW.  | Quantity.   | Value.   | Quantity.   | Value.   |
| Building stone                              | a 300, 000<br>3, 100<br>a 190, 229<br>10, 600<br>a 77, 000<br>a 2, 000<br>a 326, 000<br>a 1, 600, 000<br>32, 184, 036<br>23, 623, 508<br>26, 458, 329<br>2, 836, 557<br>369, 028<br>133, 028<br>80, 338 | 966, 262<br>369, 694<br>181, 322<br>58, 785<br>109, 208<br>81, 473 | 695,300<br>6 138,720<br>1,400<br>6 118,937<br>6,600 | \$4,115,366  7,273  51,977  8,37  270,32  254,89  17,541,09  18,679,21  1,417,89  666,13  344,47  95,58  1,352,39  3,352,39  3,26,68 |
| Total expressed approximately in short tons | 67, 235,000   | 41,309,599   | 63, 465, 000  | 46, 263, 37  |

Island, Oregon, South Dakota, Wyoming, Massachusetts, and New Mexico, which rank among the states that produce smaller quantities of limestone, showed gains of 100 to 508 per cent. The increase in Washington and Rhode Island was in stone for fluxing; in Wyoming, South Dakota, and Oregon in stone for sugar factories; in New Mexico for crushed stone, and in Massachusetts in ground limestone for agriculture.

The other states that reported increase in output showed gains ranging from 1 per cent in Ohio to 88 per cent in Georgia. The most conspicuous gain was in Pennsylvania, \$2,421,885 (30 per cent). This follows a gain in 1916 of over \$1,800,000 and in 1915 of more than \$1,000,000. Michigan increased more than \$370,000 in 1915, more than \$500,000 in 1916, and \$931,132 (38 per cent) in 1917. Many of the states showed record values in 1917, and 12 states had outputs valued in excess of \$1,000,000, one more (Alabama) than in 1916.

The decreased output shown by 11 states ranged from less than 1 per cent in Tennessee and 1 per cent in Missouri to 22 per cent in Kentucky and 33 per cent in Vermont. States whose product was valued in excess of \$2,000,000 were (named in order of rank)—Pennsylvania, Ohio, Indiana, New York, Michigan, and Illinois. In 1916 Illinois followed Indiana. Pennsylvania, New York, Michigan, and Ohio showed gains respectively of 30 per cent, 16 per cent, 39 per cent, and 1 per

cent; Illinois decreased 2 per cent and Indiana 4 per cent. Pennsylvania's value in 1917 was nearly 23 per cent of the total as against 20 per cent in 1916, 18 per cent in 1915, and 16 per cent in 1914. Over four-fifths of the value of Pennsylvania's out-put was for furnace flux and the greater part of the remaining value was for crushed stone.

## Big Shrinkage in Building Stone

The limestone sold for use as building stone, which in 1917 represented 1 per cent of the total quantity and 8 per cent of the total value, amounted to 8,277,481 cu. ft., valued at \$4,115,366-an average value of 50 cents a cu. ft. This amount was a decrease of 2,792,744 cu. ft. (25 per cent) in quantity, \$472,839 (10 per cent) in value, and 9 cents in average price per cubic foot from 1916. The value was divided about equally between rough and rough sawed stone and dressed stone. The principal districts in which building limestone is produced are the Bloomington-Bedford district, in Lawrence and Monroe Counties, Ind.; the Carthage district, in Jasper County, Mo.; and the Bowling Green district, in Warren County, Ky. The condition of the industry in these districts for 1917 has been published in ROCK PRODUCTS.

A considerable quantity of building limestone is also quarried at Rockwood, Franklin County, Ala.; near Miami in Dade County, Fla.; and at Kasota, Le Sueur County, and Mankato, Blue Earth County, Minn. The output of Alabama and Florida

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is confined to one company in each state, a fact that makes it impossible to publish figures. In Minnesota, the output of the two districts amounted to 97,002 cu. ft., valued at \$112,469, in 1917, and 100,610 cu. ft., valued at \$91,323, in 1916, a decrease in quantity but an increase in value from 1916.

Lirestone sold for paving, curbing, and flagging forms an almost negligible part of the total output of limestone. Each of these products decreased in both quantity and value in 1917.

The output of limestone for rubble, which has decreased continuously for the last 8 years decreased 5 per cent in quantity and 9 per cent in value in 1917. The principal producing states are Missouri, Wisconsin, and Illinois. Missouri decreased but Wisconsin and Illinois showed an increase in value of output.

Limestone for riprap showed a decrease in value of \$592,642 (37 per cent) in 1917. Missouri, Illinois, and Wisconsin were the principal producting states. Practically all the states producing riprap showed decrease in output, the most notable decrease being in Illinois, Kansas, Minnesota, Missouri, Ohio, Texas, and Virginia. The only notable increase was in New York.

# Crushed Stone a Big Factor

The output of crushed limestone in 1917 showed a decrease of 17 per cent (5,537,394 short tons) in quantity and less than 1 per cent (\$174,336) in value from that of 1916. The average price per ton was 66 cents, which was 11 cents more than in 1916. Of the total decrease nearly 72 per cent (3,972,352 short tons) was in crushed stone for roadmaking, a little over 1 per cent (56,274 short tons) in concrete, and about 27 per cent (1,508,768 short tons) in railroad ballast.

The only increase in 1917 is in the value of stone sold for concrete, which shows also the least decrease in quantity of production. Road metal showed the largest decrease in quantity (30 per cent) and in value (13 per cent). The decrease in 1917 followed decreases in 1916 of 9 per cent in both quantity and value.

The table herewith shows the output of crushed limestone in 1917 in the states that produced over 175,000 tons.

Of these states 8 (Florida, Indiana, Iowa, Kentucky, Minnesota, Ohio, Tennessee, and West Virginia) decreased in both quantity and value; 5 (Kansas, Nebraska, Oklahoma, Texas and Virginia) increased in both quantity and value, and 7 (Illinois, Maryland, Michigan, Missouri, New York, Pennsylvania, and Wisconsin) decreased in quantity but increased in value of output for 1917.

Over half the output of Illinois went into concrete and a little less than onefourth into road metal; in Ohio one-fourth of the output was used for railroad ballast, a little less than one-third for concrete and nearly one-half for road metal; in New Crushed limestone produced in the United States in 1917.

|                 | Quantity (short tons). | Value.      |
|-----------------|------------------------|-------------|
| Florida         | 412,969                | \$303,256   |
| Illinois        | 4,468,439              | 2,468,330   |
| Indiana         | 1,477,941              | 850,664     |
| Iowa            | 551,012                | 390, 137    |
| Kansas          | 678,310                |             |
| Kentucky        | 1,364,985              | 554, 533    |
| Maryland        | 175 007                | 801,420     |
| Michigan        | 175,297                | 197,814     |
| Michigan        | 1,327,715              | 680,178     |
| Minnesota       | 239,387                | 208,610     |
| Missouri        | 1,036,979              | 907,059     |
| Nebraska        | 382,241                | 391,351     |
| New York        | 3,334,977              | 2,281,236   |
| Ohio            | 4,140,007              | 2,381,432   |
| Oklahoma        | 883,406                | 564, 704    |
| ennsylvania     | 1,055,192              | 1, 113, 588 |
| Tennessee       | 920,998                | 517,328     |
| Texas           | 600, 214               | 379,826     |
| Virginia        | 1,345,965              | 911, 294    |
| West Virginia   | 560, 741               | 319,016     |
| Wisconsin       | 1,082,058              | 861,873     |
| Undistributed a | 607, 809               | 457,447     |
|                 | 26,646,642             | 17,541,098  |

<sup>a</sup> Alabama, Arizona, Arkansas, California, Connecticut, Georgia, Louisiana, Montana, Nevada, New Jessey, New Moxico, North Carolina, South Dakota, Utah, Vermont.

Crushed limestone sold in the United States in 1916 and 1917, by uses.

|  | 1916                                  |                                       | 1917                                 |                                       |
|--|---------------------------------------|---------------------------------------|--------------------------------------|---------------------------------------|
|  | Quantity (short tons).                | Value.                                | Quantity<br>(short<br>tons).         | Value.                                |
| Road metal<br>Railroad ballast<br>Concrete | 13,245,634<br>8,068,673<br>10,849,729 | \$7,416,984<br>3,650,647<br>6,647,803 | 9,273,282<br>6,579,905<br>10,793,455 | \$6,420,257<br>3,394,495<br>7,726,346 |
|  | 32, 184, 036                          | 17,715,434                            | 26,646,642                           | 17,541,098                            |

York two-fifths was used for concrete and a little less than two-fifths for road metal.

Though the condition of the iron trade during the first six months of 1917 indicated that a small decrease in the quantity of limestone marketed for use as furnace flux might be expected in 1917, the reports for the entire year show an increase, for the production was 25,574,146 long tons, valued at \$18,679,213, a gain of 1,950,638 long tons (8 per cent) in quantity and \$4,732,331 (34 per cent) in value over 1916. The average price was 73 cents per long ton, as compared with 59 cents in 1916.

Pulverized limestone produced in the United States in 1917.

| State.   | Quantity (short tons).   | Value.   |
|--|--|--|
| Georgia Illinois In Jiana Iowa Kentucky Michigan New York North Carolina Ohio Pennsylvania Pennessee Vermont Virguna Wisconsin Undistributed 6 | 32, 537<br>179, 848<br>46, 100<br>45, 387<br>25, 723<br>62, 027<br>82, 000<br>67, 415<br>66, 341<br>138, 323<br>60, 237<br>15, 031<br>40, 580<br>16, 000<br>163, 609 | \$58, 348<br>126, 870<br>30, 403<br>24, 584<br>22, 362<br>58, 147<br>152, 394<br>95, 285<br>93, 133<br>261, 396<br>87, 738<br>26, 894<br>46, 486<br>235, 745 |
|  | 1,040,248  | 1, 352, 397  |

<sup>a</sup> Alabama, Arkansas, California, Connecticut, Florida, Kansas, Louisiana, Maryland, Massachusetts, Minnesota, Mississippi, Missouri, New Jersey, Okiahoma, Oregon, Rhode Island, Texas, Washington, and West Virginia.

### Agricultural Limestone

Since the statistics of the production of pulverized limestone for use in agriculture were first compiled, in 1911, the output has steadily increased until 1917, when a slight decrease in quantity (0.3 per cent) was reported, although the value increased about 22 per cent. The output for 1917 was 1,-040,248 short tons, valued at \$1,352,397. The burned lime used in agriculture in 1917 amounted to 488,297 short tons, equivalent to about 980,000 tons of limestone, and was valued at \$2,475,731-a decrease of 20 per cent in quantity and an increase of 11 per cent in value. The total quantity of limestone quarried in 1917 for use by farmers was therefore about 2,000,000 tons, as compared with 2,270,000 tons in 1916. The average value of pulverized limestone in 1917 was \$1.30, an increase of 24 cents. In addition to pulverized limestone and burned lime, 73,900 short tons of calcareous marl, valued at \$165,223, was sold for this use.

Illinois was the leading state in quantity of output, but Pennsylvania, the next in rank, stood first in value. The output of Pennsylvania showed an increase and that of Illinois a decrease in both quantity and value. At many quarries pulverized limestone is a by-product, but at others it is the principal output. In some parts of the country, particularly in California, Kentucky, Virginia, and Wisconsin, where the farmers recognize the value of this product, they pulverize limestone on a community plan, which is promoted by state or county officials.

# Industrial Uses of Limestone

The quantity of limestone sold to sugar factories in 1917 showed a decided increase over that sold in 1916-from 369,028 short tons, valued at \$369,694, to 530,612 short tons, valued at \$666,138. The burned lime sold for this use increased from 21,923 short tons, valued at \$118,572, in 1916, to 47,546 short tons, valued at \$381,746, in 1917, making the total value of the limestone products sold for this purpose \$488,-266 in 1916 and \$1,047,884 in 1917. Of the total quantity of the lime burned for use at sugar factories 70 per cent (33,614 tons) was produced in California. California also furnished the largest quantity of limestone for this purpose-124,070 short tons, valued at \$167,535, but was closely followed by Colorado, which produced 117,-554 short tons, valued at \$144,125, and by Wyoming, which produced 96,288 short tons, valued at \$130,497.

The limestone sold to glassworks in 1917 amounted to 293,152 short tons, valued at \$344,479, an increase of 100,124 tons in quantity and \$163,157 in value. The burned lime sold for this purpose amounted to 60,624 tons, valued at \$316,280, making a total of \$405,103 for the value of limestone, used in glass making, Pennsylvania, Ohio, and Missouri furnished about 70 per cent of the stone and Ohio over half of the lime.

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# Trap Rock (Basalt) Production in 1917

Average Price 121/3 Per Cent Greater Than in 1916—New York State Hard Hit by Closing of Palisades Quarries

THE well-known group of road-building rocks which includes basalt, diabase, and some other dark igneous rocks that are similar in mineral composition and physical properties furnished 9 per cent of the value of all the stone produced in the United States in 1917, according to statistics compiled under the direction of G. F. Loughlin, of the United States Geological Survey, Department of the Interior.

The total value of the basalt produced in 1917 was \$7,570,885, which is \$95,412 or 1.2 per cent less than that in 1916, and the value in 1916 declined 10 per cent (\$822,-925) from that in 1915. The quantity of this stone produced decreased from 10,233,-640 short tons in 1916 to 8,852,640 short tons in 1917, a decrease of 14 per cent. Most of the stone of this class now quarried is crushed for use as road metal and in concrete, and in small part for railroad ballast. In 1917 this crushed stone represented 91 per cent of the quantity and 87 per cent of the value of the basalt and related rocks sold in the United States, and 20 per cent of the quantity and 22 per cent of the value of the total crushed stone sold.

Classification of Sales The sales of the 8,067,582 short tons of crushed stone valued at \$6,600,957, classified according to use, where divided as follows: Road metal, 3,751,396 short tons, valued at \$3,124,088; concrete 3,296,711 short tons, valued at \$2,654,410; railroad ballast 1,019,475 short tons, valued at \$822,459. There was a decrease of 940,-792 short tons (10 per cent) in total quantity, but a small increase, \$61,949 (1 per cent), in the total value of crushed basalt and related rocks in 1917. The average price per ton in 1917 was 82 cents, 9 cents more than in 1916. Road metal showed the largest decrease in quantity, 516,604 tons (12 per cent). The quantity of concrete decreased 341,705 short tons (9 per cent). The value of road metal, however, decreased \$68,536 (2 per cent), and that of concrete increased \$69,346 (3 per cent). Railroad ballast decreased in quantity 82,-483 short tons (7 per cent) and increased in value \$61,139 (8 per cent).

### Principal Producing States

The principal States producing this kind of crushed stone, named in order according to rank of value of output, are New Jersey (road metal and concrete); Pennsylvania (road metal and railroad ballast); Connecticut (road metal and concrete); California (concrete). Each of these States produced over 1,000,000 short tons, valued at more than \$900,000. New Jersey, Pennsylvania, and California each decreased in

quantity and increased in value of output during 1917; Connecticut showed increase in both quantity and value. In 1916 New York was included in this group, ranking third, but a large decrease in both quantity and value in 1917 reduced this State to fifth in rank. Continued decrease may be expected from New York as the Palisades Park Commission has taken over all the principal quarries, and is gradually closing them.

### Use as Rubble

A considerable quantity of stone of this class is used in rubble and riprap work, including jetties and breakwaters. In 1917 the quantity sold for these uses was 641,-619 short tons, valued at \$835,177; in 1916, 1,097,000 short tons, valued at \$982,-539, a decrease of more than 40 per cent in quantity and of 15 per cent in value. The decrease was due entirely to diminished production in the State of Washington, where the decrease in output in 1917 followed a large decrease in 1916.

Paving blocks of diabase and basalt decreased in both quantity (3 per cent) and value (8 per cent) in 1917. This decrease followed one of 51 per cent in quantity and 61 per cent in value in 1916. California, the principal producing State, showed a small increase in quantity, but a decrease in value in 1917. The average price per thousand was \$36.37 in 1917, a decrease of

Of the 15 States that produced basalt and related rocks 9 showed an increase in value in 1917. The principal gains were made by Hawaii (27 per cent), for rubble and riprap used in constructing the Government dry dock at Pearl Harbor and for the Hilo breakwater; Connecticut (24 per cent), for concrete and railroad ballast; California (23 per cent), for riprap, rubble and concrete; and Pennsylvania (13 per cent), for total crushed stone.

### Principal Losses

The principal losses were recorded by Washington (57 per cent, following a loss of 48 per cent in 1916) and New York (28 per cent), for road metal. The apparent decrease of 20 per cent in Massachusetts was due to a revision in classification, which involved the transfer of the value of a quantity of light volcanic rocks that had been formerly included with basalt and diabase to a "miscellaneous" group of rocks, used for road metal and concrete.

Very few statements were made by the quarrymen regarding the demand for basalt in 1917. Practically all reported that the cost of operation was higher and that labor conditions were bad. Nearly all had great

difficulty in getting and retaining help, in spite of high wages. Fuel was scarce and expensive. The prices of stone advanced but not enough to cover the increased cost of operation. Shortage of cars prevented shipments and caused quarries to shut down. In Hawaii prices of stone advanced 20 to 30 per cent during October, November, and December. Fuel oil, which formerly cost \$1.50 a barrel, could not be purchased at all and coal advanced from \$10 to \$28 a ton. In Oregon railroad ballast, which sold for 65 cents a cubic yard in 1916, advanced to 90 cents during the last half of 1917. Neither fuel oil nor coal could be obtained in sufficient quantity and wood was difficult to obtain, and the demand for stone was small and intermittent. In Michigan the quarrymen reported that the demand was good but that operating conditions and car service were bad and production therefore limited. There were 215 operators in the United States in 1917 as against 237 in 1916.

# Huge Mineral Output in 1917 Record Production

THE value of the minerals produced in the United States in 1917, according to the United States Geological Survey, Department of the Interior, was \$5,010,948,000, an increase of \$1,496,976,000, or about 43 per cent, over the former record—\$3,513,972,000—established in 1916. The blast furnace products (pig iron and ferroalloys), copper, coal, and petroleum contributed 74 per cent of the total value of minerals produced and 88 per cent of the increase in 1917.

The metals established a new record in 1917, being valued at nearly \$2,092,000,000 and representing 42 per cent of the total value of the mineral product. They showed an increase of about \$471,316,000, or 29 per cent, over the \$1,620,508,000 reported for 1916. The blast furnace products contributed nearly 90 per cent of the total increase. Increases were also made in the value of aluminum, copper, lead, and silver, but decreases were recorded in the value of gold and zinc.

The value of the nonmetallic products in 1917 was 58 per cent of the value of all minerals produced, increasing \$1,010,459,000, or nearly 54 per cent, from the former record of \$1,878,464,000 in 1916 to \$2,888,923,000 in 1917. Of this total increase coal alone represented nearly 66 per cent, and coal and petroleum combined contributed about 85 per cent.

# Granite Production for 1917

# Loss in Production and Value Not Serious

THE GRANITE sold in the United States in 1917, as shown by figures compiled by G. F. Loughlin, of the United States Geological Survey, Department of the Interior, from reports submitted by producers, amounted to 5,564,200 short tons, valued at \$15,544,957, about 7 per cent of the quantity and 19 per cent of the value of the entire output of stone during the year. The figures show a decrease of 40 per cent in quantity and 11 per cent in value from 1916 and were the lowest recorded in any year since 1901. The same adverse conditions were reported by the quarrymen for 1917 as for 1918-high wages, shortage of cars and boats for transportation, lack of labor, and high cost of all supplies, as well as substitution of cheaper material. Prices were advanced but, according to many producers, not enough to cover the increased cost of production.

This is the first year for which complete figures showing the quantity of granite produced have been recorded, and in order to compare the production with that of 1916 the output in that year has now been determined largely from actual reports and partly from estimates. The quantities are given according to the usual unit of measurement, but in order to get the total the units have been reduced to short tons.

The only product whose output increased in value in 1917 was monumental stone (7.8 per cent), although the quantity produced decreased 6.6 per cent.

Building stone decreased 3,462,721 cubic feet (49 per cent) in quantity in 1917 and \$803,129, or 20 per cent in value.

Granite paving blocks decreased 12 per cent in quantity in 1917 and 0.5 per cent in value, the average price per thousand being \$57.67, an increase of \$6.94 over 1916. A production of 19,004 tons of "Durax" blocks, valued at \$115,717, was also reported. A detailed report on this industry has been published.

Granite used for rubble decreased 85,288 short tons (34 per cent) in quantity and \$54,363 (21 per cent) in value, and granite for riprap 1,188,458 short tons (54 per cent) in quantity and \$409,379 (40 per cent) in value. This class of stone varies greatly in production from year to year, depending on the amount of river and harbor work done by the State and Federal Governments. In 1916 California, Connecticut, Delaware, North Carolina, and Virginia were the states showing greatest production for this purpose. In 1917 California decreased over 50 per cent, North Carolina about 30 per cent, and Virginia and Connecticut reported practically no output of rubble; Massachusetts showed a greatly increased production, and Arizona, Delaware, New York, and Texas were important producers although operations were confined to not more than two localities in each state.

Curbing decreased 600,817 linear feet (30 per cent) in quantity and \$129,317 (15 per cent) in value in 1917 as compared with 1916, following an increase of 19 per cent in value in 1916 over 1915. Georgia, the leading state in 1916, decreased in value \$110,427 (49 per cent), and ranked third in 1917, being exceeded by Massachusetts, which showed an increase of \$7,194 (4 per cent), and North Carolina, which showed an increase of \$35,818 (28 per cent).

Crushed granite represented 17 per cent of the value of the total granite output in 1917, and 20 per cent in 1916. There was a decrease of 1,658,279 short tons (35 per cent) in quantity and \$842,796 (23 per cent) in value in 1917. According to uses the crushed granite sold for road metal amounted to 1,176,557 short tons, valued at \$1,001,076; 478,667 short tons valued at \$269,218 for railroad ballast, and 1,409,-902 short tons valued at \$1,430,326 for concrete. There was a decrease for each product in 1917 in both quantity and value, but railroad ballast showed the greatest decrease, 59 per cent in quantity and 54 per cent in value. All the states that reported production for this purpose in 1917 decreased in output except Virginia. The total average value of crushed granite in 1917 was 88 cents a ton, which was 13 cents more than in 1916.

Of the 30 states showing granite output in 1917, 21 showed decrease and 9 increase in value of output. Six states in 1917, compared with eight in 1916 and seven in 1915, had a marketed production exceeding \$1,000,000 each, and together they represented over 63 per cent of the total value. These states in order of rank were Vermont, Massachusetts, North Carolina, Maine, Wisconsin and Minnesota. California and New Hampshire were in this group in 1916. Of these larger-producing states Maine showed an increased value of output (17 per cent), owing to increased value in spite of decreased quantity of building stone and paving blocks; and Minnesota (5 per cent), owing to increased value in spite of decreased quantity of monumental stone and paving blocks; and Vermont (9.7 per cent), owing to increase in both quantity and value of monumental stone. The decrease in Massachusetts was 3 per cent, in North Carolina 1.7 per cent, and in Wisconsin 10 per cent. The decrease in Wisconsin was due to decrease in both quantity and value of paving blocks which more than offset a small increase in monumental itone. The other states that showed an increase in value were Colorado, Delaware, Listrict of Columbia, Montana, Oregon and Texas. The decreases for all the other states were general for all purposes and in nearly every state decrease in quantity was greater than that in value.

The number of operators decreased from 598 to 483 in 1917, and several of those that operated reported their quarries closed during part of the working year.

# Bulletin on Gypsum by the Canadian Government

THE CANADIAN GOVERNMENT bulletin on gypsum reports as follows:

Ontario Gypsum Co., Ltd.—This company was formed in the fall of 1916, by an amalgamation of the Crown Gypsum Co. of Lythmore and the Alabastine Co. of Paris and Caledonia. Included in the merger are the mine in the township of Oneida, and the grinding plant at Lythmore formerly operated by the Crown Gypsum Co., the mine and grinding plant at Caledonia formerly operated by the Alabastine Co. of Paris, and the Carson mine in Oneida township. January 1st, 1917, the new company took over the management.

The Paris interests of the Alabastine Co. are not included in the merger.

The mill and mine previously operated by the Crown company were closed by the new company, and will not be operated for some time. By this deal, the Ontario Gypsum Co. acquires possession of about 1,000 acres of proven ground in the gypsum belt in addition to two large grinding plants.

Officers: W. G. Case, Buffalo, president; R. E. Haire, Paris, secretary-treasurer; and A. J. Parkhurst, superintendent.

# Will Spend Over \$4,000,000 on Roads in Louisiana

NEW ORLEANS, La.—Highway construction planned for 1919 will approximate 825 miles in this state. In cooperation with the United States government, the State Highway Department will build 150 miles of this at a total cost of \$1,500,000, the government furnishing one-third of the money. About 17 parishes have voted or will vote total bond issues aggregating \$3,675,000 for 675 miles of road. Seventy-five per cent of these bond issues is now in the treasuries in cash.

The state convention of the Louisiana-Jefferson Highway Association will be held in New Orleans, Jan. 15. The following two days the international board of directors of the Jefferson Highway Association will meet.

# Protest Against Freight Rate Increase

LITTLE ROCK, Ark.—T. E. Wood and Herbert Wilson of the Arkansas Railroad Commission two weeks ago presented protests to the Western District Freight Traffic Commission at St. Louis, Mo., against a proposed increase in rates on brick, ground limestone and marl.

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# Feldspar Industry in the United States

Nearly 127,000 Tons Quarried in 1917; Its Use for Making Potash Is Growing

THE sales of feldspar in 1917 were reported to the U.S. Geological Survey from the following states, named in the order of their output: North Carolina, Maine, Maryland, New York, Connecticut, Pennsylvania, California, New Hampshire. Named in order of the value of the product sold they are: Maine, North Carolina, Pennsylvania, Connecticut, New York, Maryland, California, New Hampshire.

California-Ten quarries operated by eight firms, one each in Tulare, San Bernardino, Monterey and Los Angeles counties and four in Riverside County, Cal., reported production in 1917. The production was much the largest recorded for the state and amounted to 7,031 long tons of crude feldspar, valued at \$18,137. Most of this was used for its potash content by the Riverside Portland Cement Co. This company uses feldspar as a raw ingredient in the manufacture of cement and recovers potash by precipitation of flue dusts from its cement kilns. The remainder of the California production was used by California pottery, porcelain, tile, and enameling works. Prices received for crude feldspar in California ranged from \$2 to \$7.80 a long ton f. o. b. quarries and averaged about \$4.50 for pottery grades.

Connecticut—Three companies in Connecticut reported production in 1917. Two operated in the Portland region in Hartford and Middlesex counties, and one at Willimantic in Windham County. The total production was less than in preceding years and together with a small production from New Hampshire amounted to 10,455 long tons of crude spar, valued at \$43,160. A small part of the total output was sold for use as abrasive and in scouring soaps, and a little for manufacturing glass. The chief part was used in pottery and enameling works.

Prices ranged from \$4 to \$7 a long ton for crude spar f. o. b. quarries, and ground spar brought from \$8.90 to \$17 a short ton f. o. b. mills, according to color and purity. The L. W. Howe feldspar mill at South Glastonbury made its usual important output of high-grade feldspar.

Delaware—There was no production from feldspar quarries in Delaware in 1917. Wilmington, Del., is a large feldpar market and a site of feldspar grinding mills.

Georgia—No report of production in 1917 has been received from Georgia.

Maine Six operators reported production from nine or more quarries in Maine in 1917. These were in the Georgetown district and near Cathance and Topsham in Sagadahoe County and at Mount Apatite and near Auburn in Androscoggin County. The total output was 31,720 long tons of crude feldspar, valued at \$131,994. This is more both in quantity and in value than the production of the preceding years. Maine ranked second in quantity and first in value among the producing states. The greater part of this production was made and sold ground by the Maine Feldspar Co., which operates mills at Topsham and Auburn, and by the Trenton Flint & Spar Co., whose mill is at Cathance.

Prices in Maine in 1917 ranged from \$3 to \$4.50 a long ton, but stood prevailingly about \$4 for crude spar and from \$11 to \$11.30, averaging \$11.05, for ground feld-spar. The output was used almost entirely in ceramics, a considerable part in the preparation of ceramic binders for carborundum and corundum grinding wheels, and a little in abrasive soaps.

Maryland—Seven operators reported production in Baltimore, Howard, and Carroll counties, Md., in 1917. The output amounted to 14,088 long tons, valued at \$56,958. In addition there was a small undetermined quantity of soda spar produced in the Sylmar, Md., district, which is unavoidably included with the Pennsylvania output. Maryland ranked third in quantity and value of the production in 1917, which was considerably less than that for 1916. Prices for crude spar ranged from \$3 to \$4.50 a long ton and averaged \$4.05 f. o. b. quarries.

New Hampshire—Feldspar was produced in New Hampshire in 1917, at two localities —Grafton and Orange, in Grafton County. The product was used in the manufacture of scouring soaps.

New Jersey—There are no productive feldspar deposits in New Jersey. Trenton is an important feldspar market, in which there are mills for grinding feldspar.

New York—New York ranked fourth in quantity and fifth in value of the feldspar output in 1917. Four companies reported

production, one in Franklin County, one in Essex County, which operated quarries and a mill for crushing and coarse grinding feldspar to be used in roofing and concrete facing, and two in Westchester County. Besides the mill mentioned there were two others in operation for fine grindingone at Bedford in Westchester County, and one at Barnard, in Monroe County. It is reported that another mill has been erected near Rochester. The total production of the state for 1917 was 12,019 long tons of crude feldspar, valued at \$44,290, which was considerably less than in preceding years. The larger part of this output was consumed as roofing, concrete facing, and chicken grits, the remainder in pottery and enamel ware. Crude pottery spar prices ranged from \$3 to \$4.50 a long ton and averaged \$3.05. Ground spar was reported to have been sold for \$7.04.

North Carolina—North Carolina ranked first in quantity and second in value of the feldspar produced in 1917. The Geological Survey received reports of production from 24 quarry operations chiefly in the Spruce Pine district, in Mitchell, Avery, and Yancey counties. The total output was 42,463 long tens of crude spar, valued at \$131,442. Prices ranged from \$2.60 to \$7 a ton, prevailingly about \$4, and averaged \$3.10. Much of the output was ground at Erwin, Tenn., and the remainder went chiefly to mills at East Liverpool, Ohio; and Trenton, N. J.

Pennsylvania - Pennsylvania ranked sixth in quantity and fourth in value of feldspar produced in 1917. Production was reported by 10 operators who drew their supply from seven large and a number of small quarries in Delaware, Chester, and Lancaster counties. The total production was 8,939 long tons of crude spar, valued at \$48,786 f. o. b. mines. A small part was crushed for chicken grits and most of the remainder was ground at Brandywine Summit and Toughkenamon. Prices for crude spar ranged from \$2 for spar for grits to \$6 for better grades of pottery spar; the average was \$5.08. Ground spar sold from \$7.20 to \$12 a ton, and averaged \$10.25. Pennsylvania spar was used chiefly for pottery and glass and in small part for abrasive soap as well as for chicken grits. The Brandywine Summit Kaolin & Feldspar Co. produces a considerable quantity of soda spar from mines in the Nottingham, Pa., and Sylmar, Md., region.

Plan New Safety Rules for Quarry Operation

AN FRANCISCO, Cal.—The Industrial Accident Commission, San Francisco, Cal., following a series of recent hearings, is arranging a set of rules for quarry safety operations. A. R. Wilson, vice-president and manager of the Granite Rock Co., is chairman of the Quarries Committee which has been co-operating with the safety engineers of the Commission in this work.

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# Another Rock Products Industry Booming—Fluorspar

Advance Statement of Output for 1917 and Estimates for 1918 Show Big Increases

STATISTICS of the flourspar industry in 1917, prepared under the direction of Ernest F. Burchard, of the United States Geological Survey, Department of the Interior, show a great increase in the domestic output of this valuable fluxing mineral as compared with former years.

The shipments of spar from the mines in 1917 were 218,828 short tons, valued at \$2,287,722, an average price of \$10.45 a ton, compared with 155,735 tons, valued at \$922,654, or \$5.92 a ton, in 1916. This represents an increase in total tonnage of 40.5 per cent and in total value of nearly 148 per cent. The quantity of crude fluorspar mined in the United States in 1917 reached a total of 280,825 short tons, compared with 175,165 tons in 1916, an increase of more than 60 per cent. The stocks of marketable spar on hand at the end of 1917 amounted to 21,655 short tons, compared with 3,666 tons at the end of 1916, but a considerable part of this stock was under contract, awaiting cars, boats, or weather favorable for shipment.

The demand for fluorspar may be said to be governed mainly by the open-hearth steel industry, so that supplies that are within reach of steel-making centers are certain to be drawn on heavily during war times. Mines in all producing states except Arizona reported an exceptionally heavy demand during 1917, and the high prices stimulated prospecting and led to the opening of many hitherto unworked deposits of fluorspar in Illinois, Kentucky and Colo-

The apparently moderate average price received for fluorspar at the mines during 1917 was largely due to the making of sales on yearly contracts, but spar not so purchased was subject to very much higher prices. In January and February, 1917, gravel spar for prompt shipment brought \$21.50 a ton at mines, and a year later \$38 to \$40 a ton was reported as the ruling price. The latter figures were unduly inflated because cold weather and railroad congestion retarded both mining and transportation. Prices decreased from these high levels later in 1918, so that in June and July \$28 to \$30 a ton at the mines was quoted for gravel spar carrying 85 per cent calcium fluoride.

Gravel spar constitutes the bulk of the shipments. In 1917 the output of this product amounted to 183,144 short tons, valued at an average price of \$9.61 a ton, compared with 133,651 tons, valued at \$5.34 a ton, in 1916. Lump spar and ground

spar also increased.

The imports of fluorspar in 1917 increased slightly in quantity but greatly in value, 13,616 short tons, valued at \$8.42 a ton, having been imported in 1917, compared with 12,323 tons, valued at \$4.38 a ton, in 1916

Estimates for 1918 are as follows:

Short-tons.
Production, first half 1918...... 100,000
Production, last half 1918...... 118,000

218,000

The estimated production for 1918 is considerably less than it might be if sufficient labor, machinery, and other supplies were available.

The shipments for the first half of 1918 are estimated at approximately 108,000 short tons, and there were about 10,560 tons of spar in stock at the mines, only about 2,000 tons of which had not been sold or contracted for on July 1, 1918.

#### Tulsa Commissioners Advertise for Bids

TULSA, Okla.—Tulsa County Commissioners of Tulsa will contract for the construction of \$1,750,000 of hard surface road to be done in 1919. They are advertising for bids for the construction of several sections of state road within its boundaries, the total being 33 miles and also the construction of the necessary culverts. This will cost about \$100,000, only about one-third of the total cost of the state road.

# Review of Magnesite Industry

Sharp Decline Since 1917

A S MAGNESITE has been distinctly a war mineral the United States Geological Survey, Department of the Interior, has collected statistics of its production quarterly during 1918 in order that Government boards might have correct information regarding the status of the industry.

The combined output of California and Washington for the year 1918 will be about 225,000 tons. This is a large decrease—about 30 per cent—from the output of 1917, when California produced 211,000 tons, and Washington, 105,000 tons.

California magnesite was in large demand in the eastern states in 1917 for use as refractory material, especially in making steel, but a combination of circumstances has greatly lessened the demand in 1918. In the first place crystalline magsite from Washington, which is accounted superior to California magnesite as a refractory material, was sent to the market in increasingly large quantities in 1917 and its output was maintained in 1918; second, an increase in freight rates and a shortage of cars reduced the demand and hindered deliveries; third, dead-burned dolomite was with fair success substituted for magnesite for making refractory products in the Eastern states. The nationwide restriction of building operations has reduced the use of California magnesite in wall plaster, stucco, flooring, and like plastic material, and dolomite is being substituted for California magnesite in the manufacture of paper on the Pacific coast.

Two California mines, the White Rock

mine, in Napa County, and the mine of the Refractory Magnesite Co. in Sonoma County, yield a product that contains more iron than other California magnesite and that is dead-burned and sold as grain magnesite and brick for use as refractory material by steel manufacturers in the Western states. These two mines, which have been steadily producing this material and will probably continue to do so, are now making a large part of the total output of the state. All the very small mines in the state are closed, and the few larger mines that remain in operation are producing at a rate representing only 25 to 50 per cent of their capacity.

In the state of Washington only two companies are operating, but they have spent large sums of money during the last two years in developing quarries and building plants and are now able to produce raw and calcined magnesite in large quantities. Each company can now turn out more than 10,000 tons of raw magnesite a month.

Practically all the magnesite produced in Washington goes in the dead-burned form to steel plants and to manufacturers of refractory products east of the Mississippi. Manufacturers of magnesite stucco and composition flooring use California magnesite and are now having some difficulty in obtaining an adequate quantity of material of the quality they desire, although their total requirements can easily be supplied by one mine of moderate capacity. It is suggested that the use of crystalline magnesite for making Sorel cement might be made the subject of further experiments.

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# Domestic Materials Supplant Imported Flint Pebbles and Linings

Cement Industry No Longer Dependent on Imported Grinding Pebbles and Tube-Mill Linings

DEFORE 1914 practically all the flint D pebbles used in grinding processes by metallurgic and cement mills in this country were imported. This was one of the supplies for which the United States was dependent on Europe. Now the United States Geological Survey, Department of the Interior, announces with satisfaction that approximately 12,000 tons of grinding pebbles for tube mills and 3,050 tons of silica tube-mill liners were produced and sold in this country in 1917. Besides these quantities of grinding pebbles and liners reported to the Geological Survey. considerable unreported quantities of pebbles and blocks of rock and ore were collected and used by metallurgic and cement

The Bureau of Foreign and Domestic Commerce, Department of Commerce, reports that the "flint, flints and flintstones, unground" imported for consumption in 1917 were valued at \$197,156. The value represents about 15,000 tons, part of which, possibly 10 per cent, was "boulder flints" ground for use in ceramic wares. It thus appears that about 30,000 tons of tube-mill lining and grinding pebbles were used in this country in 1917 and that more than 50 per cent of the demand was supplied by domestic materials. The domestic substitutes for imported flints have given satisfaction and have been no more expensive-some have been less expensive-than the French, Danish and Belgian materials, facts attested by reports of the consumers in letters to the producers and to the Geological Survey and even more emphatically by "repeat orders."

#### Sources of Grinding Pebbles

The grinding pebbles or substitutes therefor produced in the United States during the last few years have been derived principally from the three sources indicated below.

1. Grinding pebbles were gathered from the beaches between Oceanside and Encinitas, San Diego County, Cal., by the individuals and firms whose names and addresses are listed below. Smooth, round, or nearly round pebbles, ranging in diameter from 2 to 7 inches, are picked out by hand on the beaches and assorted according to size. Samples submitted to the Geological Survey are chiefly pebbles of fine-grained tuffs, granite porphyries, quartz porphyries, felsites, and granites. These are all tough rocks, and the pebbles are said to be harder to break than Danish flint pebbles, but as

they are coarser grained than flints they are not so smooth and wear somewhat faster on hard ores. Cement grinders are said to have found these pebbles as efficient as the imported flints. The waste of California pebbles per ton of finished cement is about 11/2 pounds. With extremely hard ores the California pebbles are reported to be less efficient than the Danish flints, the waste of the pebbles per ton of ore ground being more than that with Danish flints, which have also the advantage of giving a smaller load, as they are not so heavy. However, the California pebbles do the grinding as well as the Danish pebbles and cost less--in some places less than half as

2. Artificially rounded blocks of rock made at Manhattan, Nev., have been supplied to metallurgic mills near that town at prices very much lower than those of imported flints, and have proved satisfactory for grinding the ores of that region. These pebbles are made from a chalcedonized rhyolite, which is quarried and broken into polygonal blocks that are rounded by tumbling into a barrel-like mill. The tumbling also eliminates the cracked or weak blocks.

3. Near Jasper, Minn., a fine-grained, very hard quartzite is quarried and worked up into cubical or roughly rounded blocks for use as grinding pebbles and also into dimension blocks and tube-mill linings. This quartzite is a siliceous rock containing, besides quartz, only very small amounts of silicates and a little oxide of iron, which stains the rock pink. The blocks compare favorably in hardness, toughness, and specific gravity with imported flints and appear to form an equally efficient grinding agent. The use of a full load of cubical or square-edged or even of only partly rounded blocks in a tube mill undoubtedly reduces the grinding capacity of the mill, but the square edges and sharp corners of such blocks soon break off and round up, and their subsequent reduction is very slow. No doubt cubical blocks can be used efficiently if they are fed to a loaded mill in small portions at a time, so that the capacity of the mill will at no time be reduced by a heavy load of rough blocks. Such procedure is in accordance with what appears to be the best tube-mill practicethat is, of feeding a small quantity of fresh pebbles daily in order to keep the load in the mill up to the predetermined standard for highest efficiency.

The California beach pebbles and similar pebbles that contain iron in the form of oxide or silicate mineral can probably not be used without detriment to the mill product when silica, feldspar, and other ceramic ingredients are ground, for the content of iron in the higher grades of such wares must be kept very small or eliminated, but pebbles containing small quantities of iron-bearing minerals are in no way objectionable for metallurgic work and for grinding cement ingredients and clinker. The quartzite from a quarry at Jasper, Minn., contains so little iron that it can be used in grinding silica and feldspar. Several grinders of silica in Ohio and Illinois have used with satisfaction these pebbles and the silica linings from the same

Besides the localities above noted there are prospective sources of grinding pebbles in Pike, Sevier, and Howard counties, Ark., which are described in Geological Survey Bulletin 690-B, "Gravel deposits of the Caddo Gap and De Queen quadrangles, Ark.," by H. D. Miser and A. H. Purdue; on the shores of Lake Superior; on the shores of Essex County, Mass.; and in York and Washington counties, Maine. Pebbles have been supplied to cement and other mills from the beaches of Lake Superior, but they seem to have been unsatisfactory, probably because they were not carefully selected. No pebbles have been marketed from Arkansas, but the geologists who have examined the deposits there report the occurrence of large quantities of pebbles of novaculite, a very pure silica, which are of suitable sizes and shapes for use in grinding. No pebbles have been marketed from the beaches in New England, but Government geologists who have seen the beaches are confident that large quantities of granite, felsite, and rhyolite pebbles of suitable size and shape and of undoubted hardness and toughness for use in grinding can be obtained there.

#### Tube-Mill Liners

Tube-mill liners have been obtained chiefly from three localities in the United States. Two of these supply flint or chert from beds intercalated in limestone formations, and the third supplies quartzite. One is near Iron City, Tenn., where the "Fort Payne chert" is utilized. The second is in Florida, in the region of the outcrop of the Ocala limestone, from Suwanee County to Hillsboro County. The third locality is at Jasper, Minn., where the quartzite de-

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scribed above is quarried. The flint or chert and quartzite from these localities are worked up into dimension blocks by the firms listed below. The occurrence of material suitable for making flint or silica linings has been reported at two other localities, but no definite information concerning them is yet available. The beds of chert or flint in many of the limestone formations of the Appalachian and Mississippi Valley regions could probably also furnish a material suitable for silica lining, but nothing definite can yet be said concerning the availability of the rock in those beds.

The reports available to the Geological Survey show that the silica linings made from rocks at the three localities mentioned have been wholly satisfactory. The material used is practically pure silica, tough, hard, and resistant to wear, and the linings furnished have been carefully shaped to dimensions. All manufacturers report increasing business with repeat orders from their customers.

The following is a list of names and addresses of firm and individuals that sold tube-mill pebbles and liners in 1917:

#### Producers of Grinding Pebbles

Beach pebbles:

Robert Burns & Co., Oceanside, San Diego County, Cal.

Frederick E. Browne, 619 I. W. Hellman Building, Los Angeles, Cal.

Encinitas Pebble Co., P. O. Box 499, San Diego, Cal.

John T. Momand, Encinitas, Cal.

Thebo & Tingman, Encinitas, Cal. Artificially rounded rhyolite:

Omer Maris, Manhattan, Nev.

Cubical or partly rounded 3 to 5-in. quartzite blocks:

Jasper Stone Co., 204 Lytle Building. Sioux City, Iowa.

#### Producers of Silica Linings

S. W. Chiles, 123 Garrison street, Bethlehem, Pa.

E. L. Lull, Prop., American Flint Co., Iron City, Tenn.

Jasper Stone Co., 204 Lytle Building, Sioux City, Iowa.

# Sandstone Industry Holds (

Slight Decrease in Production for 1917—Ganister Increases

THE SANDSTONE MARKETED in the United States in 1917, according to reports of producers to G. F. Loughlin, United States Geological Survey, Department of the Interior, amounted to 3,959,000 short tons, valued at \$5,512,421. This value is a decrease of 1.6 per cent from that for 1916, which was in turn a decrease of 8 per cent from that for 1915. Excepting in 1909, 1913, and 1914, the value of the sandstone sold has shown a decrease each year since 1903. The decrease in quantity for 1917 was 715,300 short tons (11 per cent). In 1917 the sandstone sold represented 6.7 per cent of the total value of stone sold and 4.7 per cent of the total quantity.

The three leading states, which contributed over 66 per cent of the total value of sandstone, were Pennsylvania (\$1,794,-919), Ohio (\$1,086,027), and New York (\$760,582). Pennsylvania and New York reported increases in value in 1917. The increase for Pennsylvania was mainly in the value of ganister, as except for a small increase in crushed stone for concrete, all other sandstone products showed a decrease. Ohio's principal sandstone products were building stone, curbing, and flagging, the output of all of which decreased in 1917.

In New York increases in value were reported for rough building stone, paving, curbing, and flagging, and decreases for dressed building stone and crushed stone. The states reporting a production of sandstone numbered 35, of which 24 showed decreased output. The decreases were general for all uses of stone. The increase in Wisconsin was in quartzite (ganister) used in the manufacture of refractory brick. Colorado's increase was in building stone and ganister. The considerable increase in North Carolina was due to the quarrying of a large quantity of stone in Burke and Mc-Dowell Counties near Bridgewater for the construction of a dam. The most noticeable decreases were in Minnesota (building and crushed stone) and in Texas (riprap and crushed stone).

An apparent decrease in building stone and crushed stone for concrete in New Jersey was due to the reclassification of argillite with "miscellaneous stone."

The number of quarries reporting operation in 1917 was 356, compared with 436

#### Ganister Now Important Factor

Ganister rock, a quartzite or sandstone used in the manufacture of silica brick and for lining furnaces, was brought into prominence in 1915 by the unusual demand for refractory material for use in the war industries. In 1917 this product represented about one-third of the total quantity of sandstone quarried and over one-fourth of the total value. The total production in 1917 was 1,301,177 short tons, valued at \$1,350,500, an increase of about 51 per cent in quantity and of 155 per cent in value.

Curbing and flagging are two sandstone products that have shown continued decrease for several years, owing to competition with concrete. The value of curbing in 1917 was \$651,564, which was a decrease of \$51,338 (7 per cent) and followed a decrease of \$187,562 (22 per cent) in 1916. Ohio, New York, and Pennsylvania were the only important producing states. The value for New York (\$275,254) was the only one showing an increase. The value for Ohio (\$305,581) is nearly onehalf of the total value of sandstone curbing. The greater part of the curbing sold in New York and Pennsylvania was, as usual, bluestone. The total quantity of curbing (2,177,560 linear feet) decreased 10 per cent.

The value of the sandstone sold for paving blocks (\$352,808) increased 7.8 per cent, and this was the only sandstone product other than ganister that showed increase in

value. The quantity, however, decreased 2.8 per cent. Sandstone paving blocks were produced in 7 states in 1917, compared with 13 in 1916. New York, Pennsylvania, and Wisconsin were the leading producers. New York's output, valued at \$171,566, was an increase of 30 per cent; Wisconsin's, valued at \$44,711, an increase of 92 per cent, and Pennsylvania's, valued at \$73,087, a decrease of 6.5 per cent. Colorado, Minnesota, South Dakota, and Utah, the other states producing sandstone paving blocks in 1917, showed decreases in value. The principal quarrying districts for sandstone paving blocks are Sandstone, Pine County, Minn.; Medina and vicinity, Orleans County, N. Y.; Dell Rapids and Sioux Falls, S. Dak.; and Sauk County, Wis.

#### Marble Production in 1917

THE VALUE of marble sold in the United States in 1917, according to reports made by the producers to G. F. Loughlin, United States Geological Survey Department of the Interior, was \$6,330,387, a decrease of 10 per cent (\$702,784) from the value in 1916 and the lowest annual value for our marble output since 1904. The quantity produced in 1917 was about 3,627,-750 cu. ft. (310,130 tons), as against about 4,795,000 eu. ft. (409,970 ton) in 1916-a decrease of 24 per cent. The quantity produced in 1917 included a small proportion of Serpentine, as shown in a later paragraph, but no "onyx marble."

Of the marble sold in 1917, 2,156,351 eu. ft. (about 184,370 ton), valued at \$6,100,-280, was building and monumental marble -a decrease of 33 per cent in quantity and 11 per cent in value compared with 1916. The average price of this stone per cubic foot was \$2.83 in 1917 and \$2.13 in 1916.

The marble sold for use as flux, terrazzo and mosaic work, and ornamental stone, and the pulverized marble sold for use in agriculture and in manufactures amounted to 125,764 tons, valued at \$230,107. The marble sold for these purposes in 1916 amounted to 136,217 short tons valued at \$209,155.

# Stabilization of Building Material Prices Awaited by Country

While Demand for All Kinds of Construction Work Is Great, Investors Hesitate Because of Uncertainty of Costs—Big Crushed Stone Merger

NEW YORK—Before building money will freely flow into projected construction work the building material manufacturer and dealer, laborer and equipment supply interests must show that prices of all commodities have been brought to a stage of stability, according to The Dow Service Daily Building Reports.

In the absence of such assurance lenders are cautious, not because they fear their ability to compete with structures built before the war, but because they are wary of a condition where excessive demand for building materials today when the quantity available is below normal, might result in such a stampede of prices, labor costs, etc., as to effectively prohibit construction.

#### Analysis of Conditions

Walter Stabler, Comptroller of the Metropolitan Life Insurance Company, probably the most dominant of institutions lending money on building construction throughout the country, says:

"At no time has the present condition of the mortgage market been even approximated, nor have the present real estate conditions ever before existed. The whole country reports rentals as higher in most cases than ever and no vacancies of moment in either business or residence properties; and while expenses for taxes, coal and labor are much higher than usual, the net returns are better and generally satisfactory. Places for residence are scarce, and in many cities great congestion has resulted. There is, therefore, a strong demand for new buildings of all kinds, particularly for residence purposes.

"Materials for new construction are scarce, with few exceptions, and prices higher than has ever been known. Labor is also scarce and higher than ever dreamed of. Any active demand, therefore, for any great amount of new construction would surely result in further advances of cost to a point that would be prohibitive and dangerous.

#### Matter of Finances

"Even if prices for material and labor should remain at figures no higher than are now current, there is an entire absence of the first requisite for such operation, viz: the money absolutely needed to finance buildings. No sane builder can or will start his buildings unless he knows and can convince his supply dealers where the necessary money is to come from."

of normal building market developing along the Atlantic seaboard from Baltimore to Boston. In the absence of the extreme high prices of one material, architects are turning to another. The stone interests, hearing of the stiffening price of common brick, for instance, have been rushing great quantities of this material to large distributing centers like New York, Boston and Philadelphia and today there is immediately available 1,000,000 ft. of Indiana Limestone deliverable to job at prices barely above those ruling before the war. Where there has been a tendency to boost yellow pine prices enterprising Pacific coast Douglas fir interests have brought 20,000,000 ft. of this material to this market for immediately delivery at low levels. The glass manufacturers are about to grant a 25 to 30 per cent advance to workmen, but under this plan they will not employ more men than were employed last year so that production in this department will be only 50 per cent of normal, but prices will be stabilized.

Judged by the last two years of construction in this district, a very generous building market is developing among that type of construction that can be financed entirely by private funds. This includes business, commercial and industrial work and it will be sufficient to give everyone a fair share of construction. The peak of the building movement cannot be expected until the summer of 1920 and under the present financial and construction controlling influences, it is entirely beyond the power of individual or corporate manipulation to advance it.

#### Big Merger of Crushed Stone Firms

Putting into effect practical efforts to cut cost of construction to consumers, a \$2,650,000 merger of eight great stone crushing plants supplying this market will be perfected this week.

It involves seven plants located at various points along the Hudson river and one at East Haven, Conn. The new company is to be known as the New York Trap Rock Corporation and will have its headquarters at 101 Park-av, New York, with Nathaniel D. Lancaster, president; Mortimer D. Wandell, vice-president; James J. Shaw, vice-president; R. W. Jones, Jr., treasurer; and R. E. Desbernini, secretary. The directors are to be Wilson P. Foss, long identified with the crushed stone interests of New

In the interim there is about 20 per cent of normal building market developing ong the Atlantic seaboard from Baltipore to Boston. In the absence of the externed high prices of one material, archivets are turning to another. The stone interests, hearing of the stiffening price of the externed to the property of the stiffening price of the externed to the property of the stiffening price of the externed to the property of the stiffening price of the externed to the property of the externed to the externed to the property of the externed to the externed

"The completion of negotiations for the acquisition of these important crushed stone properties is the culmination of a general belief in the great future for building and road construction and the imperative necessity for transacting business, without regard to kind, along intensive lines. Under the unification of these plants much can be accomplished in putting the building market in more stable condition. The capitalization will be \$2,650,000 divided into \$750,000 in first preferred cumulative bonds; \$400,000 in second preferred non-cumulative bonds and the remainder in common stock. Incorporation will be under the laws of the state of New York.

The two principal companies involved are the New York Trap Rock Co. and the Upper Hudson Blue Stone Co. Except for the plant of Calvin Tompkins at Tompkins Cove, the combination practically embraces all the stone crushing establishments supplying this market through either the North or East rivers.

The current quotation on crushed stone is approximately \$1.85 a cu. yd. whereas one year ago the price was \$1.65 and the year before that \$1.20 and a normal rate of about 80 cents a yard.

#### Efforts to Stabilize Prices

Contractors, building material manufacturers and dealers alike are making an effort to establish a market that can be relied upon by those who contemplate construction. The building market at present is almost entirely stagnated by reason of strikes and lockouts of labor in the building trades.

The efforts to bring about more stable conditions in the building material price market has already brought out some commercial mortgage money, but speculative building financing probably will be deferred until after the first of July by which time the volume of construction then moving may be determined. Space released by the Government is being snapped up quickly which has had a strengthening effect upon the commercial construction market.

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#### Apparatus For Conveying Dry Sand by Compressed Air

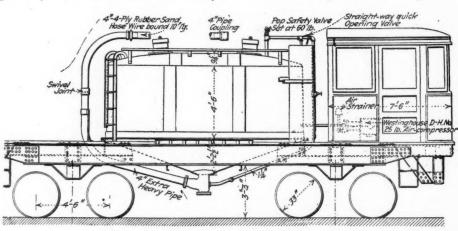
MANY POSSIBILITIES are opened by a successful experiment in handling dry sand with compressed air. While the particular case described is not directly applicable by rock products producers, doubtless many operators will be able to see how the same principles can be applied in a great variety of way: to handling such materials as dry sand, pulverized agricultural limestone, and possibly cement, in bulk.

The apparatus illustrated herewith is a car built by the United Railways of St. Louis, Mo., for handling track sand.

From this car the sand is unloaded by air pressure, and the results have been very

25 cubic feet of air per minute at 90 pounds pressure, and two 18-inch by 72-inch air reservoirs which are connected to the sand tank through a quick-opening valve.

The operation of the car is very simple. The car is loaded at the dry sand plant through the two openings in the top of the sand tank. The caps are screwed on and the car proceeds to the bins. Pressure is pumped up in the reservoirs while the car is traveling, and upon arrival is turned on to the sand through the quick opening valve at a pressure of from 25 to 60 pounds per square inch. The sand is forced down into the T-shaped casting at the bottom of the tank and, assisted by air pressure entering the T through the 1¼-inch pipe, is forced up and out through the stand pipe and hose. Sand begins to flow at 25 pounds



Car for handling dry sand by compressed air

gratifying both in the amount of labor saved and also in the time reduction. With a crew of two men the car will deliver about 1000 cubic feet of sand per day, as compared with 400 cubic feet per day with four men when unloaded manually.

The sand tank, which is 12 feet in diameter and has a capacity of 360 cubic feet, is placed in the middle of the car. In the concave bottom of this tank there is an opening to which is riveted a T-shaped casting. A 4-inch discharge pipe leads from one side of this casting and extends vertically up the back of the tank and over the top by means of two large radius bends. A wire-bound rubber hose is attached to the free end of this pipe. There is a 4-inch gate valve at the end and a swivel joint between the bends so that the pipe may be turned at any angle. Directly opposite this opening in the casting is a 11/4-inch pipe leading to the compressed-air equipment.

The compressed-air equipment consists of two type DH-25 Westinghouse motor-driven compressors capable of delivering

pressure, but operates best at about 40 pounds. The tank is designed for 60 pounds working pressure, and is protected by a safety valve at the top.

## Resigns from Highways Transport Committee

WITH the cessation of hostilities, Roy D. Chapin, chairman of the Highways Transport Committee of the Council of National Defense, has tendered his resignation to Secretary of War Baker, chairman of the council.

Mr. Chapin, who is president of the Hudson Motor Car Company, returns to his business in Detroit after a year's service in Washington helping the Government energize the highways of the country and increase the flow of commodities over them. The work of the Highways Transport Committee will be taken up by John S. Cravens, chief of the Field Division, Council of National Defense.

#### Cutting Down Screen Changes

TT USED to be that the man operating a crushing plant was kept busy quite a lot of the time and put to considerable expense changing screens to suit the notions of dif. ferent customers. It was a sort of daily nightmare to change screens and empty bins. Now, however, there is a pretty widespread tendency to cut out a lot of screen changing, to get down to a sensible standard and educate customers to take what is made regularly instead of having ideas humored at the expense of the crusher man. Have you been putting into practice the idea of curtailing screen changes? If so, how far have you gotten with it? Can you take an equipment of six bins and make these serve the needs of your trade without having to clean out and change from time to time? There is plenty of work and work cost around the quarry and crushing plant without adding to it with unnecessary changes and clean-ups, and the curtailing of this work should be one of the first orders of the day.

#### Pulverizer Upkeep

THE UPKEEP of stone-grinding and crushing machinery is always an important item, and it generally grows in importance in proportion to the fineness of the product if we reckon from a tonnage basis. What the average man likes to know about it is whether or not his upkeep is running higher or lower than that of the other fellow, and that makes of this subject an interesting one for exchange of experience through the columns of the trade paper and at association gatherings.

#### Some Operating Experience

Here for example is a man who says that he has operated a hammer type of pulverizer a little better than two months, turning out from three to five cars a day, and he is just turning the hammers for the first time. He figures that they will now run two months more, after which he will adjust closer, then at the end of two more months turn again, giving him all told eight months' service before replacing.

Considering the product in this case as being reduced to % and finer, it forms some basis for comparison to see whether or not you have a lighter upkeep toll. Of course there is the comparative hardness of the rock and other local conditions to be taken into consideration, but these do not vary so much, but what useful information can be had from a comparison of upkeep and results obtained with stone-working machines.

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#### Agricultural Limestone Wholesale at Plant, per Ton

EASTERN: Coldwater, near Rochester, N. Y .-(80% thru 100 mesh) Analysis, CaCo<sub>3</sub>, 56.77%; MgCo<sub>3</sub>, 41.74%... 2.25@2.65 Danbury, Conn.—(50% thru 100) Analysis, CaCo<sub>3</sub>, 96%; MgCo<sub>3</sub>, 2%; ppr., \$4.00; bulk...... 2.75 Hillsville, Pa.—(90% thru 100 mesh) in 80 lb. ppr. bags, \$4.50; bulk..... 3.00 Jamestown, N. Y.—(90% thru 100 mesh)—Bags ..... 2.50 mesh)—Bags
Pownal, Vt. (50% thru 100) Analysis, CaCos, 96%; MgCos, 2%; ppr., \$4.00; bulk
Walford, Pa.—(70% thru 100 mesh; 90% thru 50 mesh; 50% thru 50 mesh; 50% thru 40 mesh; 50% thru 4 mesh), paper sacked.
Bulk 2.75 West Stockbridge, Mass. — (50% thru 100) Analysis, CaCo<sub>3</sub>, 96%; MgCo<sub>3</sub>, 2%; ppr., \$4.00; bulk..... 2.75 CENTRAL: Greencastle, Ind. — (50% thru 50 mesh) Analysis CaCo<sub>3</sub>, 98%..... 1.75 mesh) Analysis CaCo<sub>3</sub>, 98%.....

Lannon, Wis.—(50% thru 50 mesh)
Analysis, 53.35%, CaCo<sub>3</sub>; 43.27%
MgCo<sub>3</sub>.....

Marble Cliff, O.—(50% thru 100
mesh) Analysis, CaCo<sub>3</sub>, 86%;
MgCo<sub>3</sub>, 8%......

Marblehead, O.—(50% thru 100
mesh; 60% thru 50 mesh; 100%
thru 10 mesh)—Analysis (Min.),
CaCo<sub>3</sub>, 32.03%; MgCo<sub>3</sub> 3.75%.
Bulk, \$3.00; ppr. 80 lb. sack....

McCook, Ill.—(90% thru 4 mesh)... 2.00 3.00 Piqua, O.—(70% thru 100 mesh).... 2.50@4.00 Rockford, Ill.—Analysis, CaCo<sub>3</sub>, 53.75%;MgCo<sub>8</sub>, 44.35%.... Stolle, Ill. (near East St. Louis on I. C. R. R.)—(Thru ¼" mesh) Analysis, CaCo<sub>3</sub>, 89.61 to 89.91%; MgCo<sub>3</sub>, 3.82%. 1.50 SOUTHERN: SOUTHERN:
Brooksville, Fla.—Pulverized limestone
Cartersville, Ga.—(50% thru 100 mesh) Analysis, combined carbonates, 96%.
Fletcher, N. C.—(100% thru 10 mesh) Analysis, CaCo<sub>3</sub>, 90%; MgCo<sub>3</sub>, 80%. Paper, \$3.75; bulk..
Irvington, Ky.—(50% thru 4 mesh).
(Continued on next page.) 3.50

(Continued on next page.)

2 25 1.90

## Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

|  | C                             | ed Lim   |   |   |  |                    |
|--|-------------------------------|--|---|---|--|--------------------|
| City or shinning noint   | Screenings,<br>4 inch<br>down | 14 inch  | % inch<br>and less<br>1.20<br>all sizes from        | 1½ inch 2   | 1/2 inch   | 3 inch             |
| EASTERN: uburn and Syracuse, N. Y. Burlington, Vt. Coldwater, nr. Rochester, N. Y.   | down<br>80                    | and less   | 1.20  | 1.20  | 1.20   | 1.2                |
| suffalo, N. Y  |                               | 1.25, 1  | all sizes from                                      | n stock pile  | 88.  |                    |
| oldwater or Pochester N V  | *******                       |  |   |   | (lo  |                    |
| rove, Md   |                               |  | 0.05  | 9.05  | 1 65   | 1.50               |
| lagerstown, Md   |                               | \$2.00 for   | all sizes   |   |  |                    |
| orth Leroy and Akron, N. Y.  | \$1.00 for                    | all sizes,   | ncluding R.   | R. ballast  | (local tra                                       | de only)           |
| Valford, Pa.   | 1.25                          | 1.50   | 1.50  | 1.50  | 1.50   | 1.5                |
| CENTRAL:   |                               |  |   | 1.00  |  |                    |
| lden, Ia<br>lton, Ill.<br>olumbia, Ill. (near E. St. L.)   | 1.20                          |  | 1.00  | 1.00  | ********   | ******             |
| olumbia, Ill. (near E. St. L.)   | 1.25@1.80                     | 85@1.20  | 95@1.30   | .95@1.30  | .80@1.20   |                    |
| etroit, Mich   | variou                        | s sizes \$1  | .su per net   | ton   |  | .9                 |
| etroit, Michundas, Ontden and Brillion, Wis  | .65                           | 1.10   | 1.10  | 1.10  | .90  | .2                 |
| lmhurst. Ill   | 1.00                          | 1.00   | her sizes 1.<br>1.00                                | 1.00  | 1.00   | .90@1.0            |
| t. Wayne, Ind  | Variou                        | is siges \$1   | .60 per net   | ton   |  |                    |
| undas, Ont. den and Brillion, Wis lmhurst, Ill t. Wayne, Ind ull, Canada reencastle, Ind linois, Southern annon, Wis   | 1.20                          | 1.20   | 1.20  | 1.05  | .80  | 1.3                |
| reencastle, Ind  | 1.00@1.25                     | 1.10   | 1.00  | 1.25  | 1.25   | 1.1                |
| annon, Wis   | 2.00                          | 4.40   | 1   | .10 all sizes   |  |                    |
| ewisburg, O  | 1.00                          |  | 1.10  | 1.00  | 1.00   | 1.0                |
| ma, Ohio   | 1.00                          |  | 119   | .10 all sizes   | 1.13   |                    |
| ankato. Minn   | .50                           |  | 1.10  | 1.05<br>1.25  |  |                    |
| unnon, Wis. ewisburg, O. lma, Ohio lnwood, Scott Co., Ia. ankato, Minn. ayville, Wis. ccCook, Ill. shkosh, Wis. ttawa, Can. lver Rouge, Mich. ockford, Ill. heboygan, Wis. | .75                           | .75  | .75<br>90@1.10                                      | 1.10  | 1.10<br>70@ .85                                  | 1.                 |
| cCook, Ill.  | \$1.00@1.25                   | 1.50@1.65  | 90@1.10   | 70@ .90   | 70@ .80  | 1000               |
| ttawa Can  | 1 00                          | 2.00 in  | all sizes, B  | 1.75  |  |                    |
| iver Rouge, Mich   | .90@1.00                      | 1.25   | 1.25  | 1.20  | 1.25   | 1.                 |
| ockford, Ill   | 1.25                          |  |   | 1.25  | 1.25   | 1.                 |
| heboygan, Wis<br>herman and Hamilton, Wis.   |                               |  | 80@1.00 for<br>All sizes 1.0                        | all sizes   |  |                    |
| tone City. Ia  | .50                           | (1-incl  |   |   | 1.00   |                    |
| tone City, Iaoledo, Ohio   | .60@1.00                      | .90@1.10   | .90@1.10  | .90@1.10<br>2.00  | .90@1.00   | .90@1.0            |
| oronto, Can  | 1.55                          | 2.00   | udes 90c pe   | 2.00  | 1.00   | 4.0                |
| SOUTHERN:  |                               | Inc  | dues soc pe   |   |  |                    |
| rookville, Flaort Springs, W. Va   |                               |  |   | 2.50  | 1.40   | 1.3                |
| ort Springs, W. Va   | .50                           | 1.60   | 1.60<br>ay ballast 1                                | 1.70  | 1.10   | 4                  |
|  |                               |  |   | .90   | .90  |                    |
| vington, Kyadds, Ga  |                               | 2.40<br>1.00   | 2.30  | 2.20  | 2.10   |                    |
| ascot, Tenn  |                               | 1.00   | 1.20 any  | oleo.   |  |                    |
| tephensburg, Ky<br>/innfield, La   | 1.20                          | 1.59   | 1.80  |   | 1.80   | 1.                 |
| WESTERN:   |                               |  |   |   | 1 40   | 1.                 |
| tchison, Kans  | .50                           | 1.50   | Rip-Rap   | a 1 00 1.50   | 1.40   | 1.                 |
| lue Sprgs. & Wymore, Neb.  |                               | (Florence  | flint imbed   | lded in lim   | estone)  |                    |
|  | .15                           | 1.35   | 1.35  | 1.25  | 1.10   |                    |
| arthage, Mo  | 1.50                          | 1.50   | 1.25  | 1.25  | 1.20   |                    |
| arthage, Moll Paso, Tex  | .60                           | 1.35   |   | 1.35  | 1.35   | 1.                 |
|  | Crushe                        | ed Tra   | p Rock  |   |  |                    |
|  | Screenings,                   |  |   |   |  |                    |
|  | ¼ inch                        | 1/2 inch   | % inch  | 1½ inch<br>and less   | 21/2 inch  | 3 inc              |
| City or shipping point   | 14 inch<br>down               | and less   | and less  | and less  | and less   | and lar            |
| irdshore, Md. (vicinity)—  | 1.25                          | 3.15   | 1.70  | 2.50<br>1.50  | 2.40<br>1.50                                     | 1.                 |
| city or snipping point<br>altimore, Md. (vicinity)—<br>irdsboro, Pa<br>ranford, Conn.—Trap<br>uluth, Minn.—Trap<br>len Mills and Rock Hill, Pa.<br>—Tran                   | 1.00                          | 1.40   | % inch<br>and less<br>2.75<br>1.70<br>1.40          | 1.35  | 1.25   |                    |
| uluth, Minn.—Trap  | .65@ .75                      |  |   |   | 1.15@1.25<br>1.60                                | 1.4                |
| len Mills and Rock Hill, Pa.   | 1.10                          | 1.40<br>P. P. 1  | 1.80  | 1.60  | 1.00   | 1.7                |
| ittle Rock, Ark.—Trap  |                               | 1.75   | 1.75  | 1.75  | 1.50   | 1.3                |
| —Trap ittle Rock, Ark.—Trap illington, N. J. ontrose, Ia.—Trap.  | 1.75                          | 1.85   | 1.75  | 1.75<br>1.05@1.10   | 1.60   | ******             |
| ontrose, Ia.—Trap<br>orristown, N. J.—Trap   | 1.85                          | 1.10@1.20<br>1.75  | 1.10@1.25<br>1.75                                   | 1.05@1.10   | 1.40   | 1.                 |
|  | 4.00                          | 1.30   | 1.25  | 1.20  |  |                    |
| ew Britain, Conn   |                               | 1.30   | 1.25  | 1.20  |  |                    |
| ew Britain, Conn<br>orth Branford, Conn.—Trap.   | .80                           |  | 1.75  | 1.65<br>1.00  |  |                    |
| ew Britain, Conn<br>orth Branford, Conn.—Trap.   | .80                           | 1.00   | 1 10  |   |  |                    |
| ew Britain, Conn<br>orth Branford, Conn.—Trap.<br>ichmond, Cal.—Trap<br>Vestfield, Mass.—Trap  | .80                           | 1.00   | 1.10<br>chod C4                                     |   |  |                    |
| ew Britain, Conn   | scellaneo                     | 1.00   |   |   |  |                    |
| lew Britain, Conn  | scellaneo                     | us Cru   | shed St   | one   | 214 inch   | 3 inch             |
| lew Britain, Connorth Branford, Conn.—Trap.ichmond, Cal.—TrapVestfield, Mass.—Trap   | scellaneo                     | us Cru   | shed St   | one 1% inch and less  | 21/2 inch  | 3 inch             |
| lew Britain, Connorth Branford, Conn.—Trap.ichmond, Cal.—TrapVestfield, Mass.—Trap   | scellaneo                     | us Cru  4 inch and less  | shed St   | one 11/2 inch and less 2.25   | and less   | 3 inch<br>and larg |
| lew Britain, Connorth Branford, Conn.—Trap.ichmond, Cal.—TrapVestfield, Mass.—Trap   | scellaneo                     | 1.00 Cru  1/2 inch and less  | shed St<br>% inch<br>and less                       | one 14 inch and less 2.25 .85   | and less a                                       | and larg           |
| lew Britain, Conn  | scellaneo                     | 1.00 Cru 4 inch and less   | % inch<br>and less                                  | 11/4 inch<br>and less<br>2.25<br>.85<br>1.25                          | .35<br>1.00                                      | and larg           |
| lew Britain, Conn  | scellaneo                     | 1.00 Cru 1.00 inch 2 in | % inch<br>and less<br>.95<br>1.35<br>her sizes 1.00 | one 14 inch and less 2.25 .85 1.25 ), including                       | .35<br>1.00<br>R. R. balls                       | and larg           |
| few Britain, Conn  | scellaneo                     | 1.00 Cru 4 inch and less 1.05 1.00 Ott   | % inch<br>and less<br>.95<br>1.35<br>ner sizes 1.00 | one 114 inch and less 2.25 .85 1.25 ), including Basalt and           | .35<br>1.00<br>R. R. balls<br>1.50<br>other kind | 1.0                |
| New Britain, Conn  | scellaneo                     | 1.00 Cru 1.00 inch 2 in | % inch<br>and less<br>.95<br>1.35<br>her sizes 1.00 | one  1½ inch and less 2.25 .85 1.25 0, including 1.76 Basalt and 2.25 | .35<br>1.00<br>R. R. balls                       | 1.0 ast 1.5 ds 2.0 |

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#### Agricultural Limestone Wholesale at Plant per Ton

(Continued from preceding page.) Keystone, Ala.—(90% thru 50 mesh) Analysis, CaCo<sub>2</sub>, 99.50%; MgCo<sub>2</sub>, none 1.25 Mascot, Tenn. — Analysis, CaCo<sub>3</sub>, 52%; MgCo<sub>8</sub>, 38%.
(90% thru 100 mesh).
(50% thru 100 mesh).
(75% thru 200 mesh).
Paper bags, \$1.50 extra per ton; burlap, \$2.50 extra per ton. Stephensburg, Ky.—Analysis, CaCo<sub>3</sub>, Winnfield, La.—(50% thru 50 mesh) 3.00 WESTERN Cement, Cal.-(50% thru 100 mesh) 4.00 Elsberry, Mo.—(Pulverized) An-alysis, CaCo<sub>3</sub>, 99.29%...... 1.85@1.95 Fresno, Cal.—(All thru 40 mesh)
Analysis, CaCo<sub>3</sub>, 98%; MgCo<sub>3</sub>, 1%.
(50% and 40% thru 200 mesh)
sacked, \$5.50; bulk, \$5.00. (100%
thru 40 mesh) sacked, \$5.25; bulk
Bulk Kansas City, Mo.-(50% thru 100 mesh) 1.50

#### Current Wholesale Prices in New York

URRENT wholesale prices, prevailing on the Building Material Exchange and elsewhere in the Metropolitan district in New York, are given as below in the (Continued on page 35.)

### Miscellaneous Sands per Ton

at Plant Silica sand is quoted washed, dried and screened, unless otherwise stated. GLASS SAND: Bowmanstown, Pa.-Glass sand... Cedarville, N. J.-Glass..... 1.50@4.00 Hellam, Pa.—Glass..... 2.00 Gray's Summit, Mo.—Glass..... 2.00@2.50 
 Kermit, Va.—Glass sand:
 2.25@2.75

 Washed
 2.25@2.75

 Crushed
 1.75@2.00

 No. 2
 1.00@1.25
 Mapleton, Pa.—Glass, damp...... Glass, dry.... Massillon, Ohio-Glass..... Montreal, Can.—Glass..... 3.00@3.50 Montoursville, Pa.—Glass...... 1.25@2.00 Oregon and Wedron, Ill.-Glass.... 2.00@2.50 Ottawa, Ill.—Silica...... 2.00@2.50 St. Mary's, Pa.—Glass sand—Green, \$2.50; washed ..... South Vineland and Cedarville, A. J.—Glass Vineland and Cedarville, N. Sugar Grove, Ohio-Glass..... 2.00@2.25 Thayer, W. Va.—Glass..... FOUNDRY SAND: Albany District, N. Y .- Molding .... 2.00@2.50 Allentown, Pa.-Moulding..... 1.40@1.50 Bowmanstown, Pa.—Molding...... Fleetwood, Pa.—Silica heating..... Kansas City, Mo.—Core..... Montreal, Can.—Molding ..... 2.75@3.25 

Zanesville, O.-Moulding...... 200@2.25

## Wholesale Prices of Sand and Gravel

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

#### Washed Sand and Gravel

|   | 771        | a       |       | ~                            |                 | ~ .             | _          |
|---|------------|---------|-------|------------------------------|-----------------|-----------------|------------|
| City on oblaning point                    | Fine sand, | Sand    |       | Gravel,                      | Gravel,         | Gravel,         | Gravel,    |
| City or shipping point EASTERN:           | down       | 14 inc  |       | 1/2 inch                     | 1 inch          | 1½ inch         | 2 inch     |
| Bowmanstown, Pa                           |            | and le  | .20   | and less                     | and less        |                 | and less   |
| Ruffalo N V                               | ******     |         |       | .25 cu. yd.,                 | all eizon       | *******         | *******    |
| Buffalo, N. Y. (Niagara River)            | 1.00       |         | .85   | .80                          | .80             | .80             | .80        |
| Libby's Pit, Leed's Junct, Me.            | 1.00@1.15  | .50@    | .75   | 1.50                         | .80<br>1.45     | 1.35            | 1.25       |
| Morristown, N. J                          |            | .50@ .  |       | .95@1.00                     | .95@1.00        |                 | 1.20       |
| No. Wilbraham, Mass                       | ******     |         | .50*  | 1.75*                        |                 | 1.20*           | 1.05*      |
| Pittsburgh, and McKeesport,               |            |         |       |                              |                 |                 | 2.00       |
| Pa  | *******    | 1.25@1  | .50   |                              |                 | 1.05            | 1.05       |
| Washington, D. C                          | .75        |         | .75   | 2.00                         | 1.70            | 1.40            | 1.20       |
| Washington, D. CWharves.                  |            |         | .75   | 2.00                         | 1.40            | 1.20            | 1.20       |
| CENTRAL:                                  |            |         |       |                              |                 |                 |            |
| Algonquin, Ill                            |            |         |       | .50 per cu                   | . yd. (3,000    | ) lbs.)         |            |
| Barton, Wis                               | .75        |         | .70   | 1.00                         | .70             | .70             | .70        |
| Beloit, Wis                               | .40        |         | .40   | .50                          | .40             | .40             | .40        |
| Chicago, Ill                              | 100 50     | .95@1   |       | 100 50                       | FA@ 60          | .95@1.05        | FAC: 44    |
| Cincinnati, Ohio                          | .40@ .50   | .40@    | .60   | .40@ .50<br>.50              | .50@ .60<br>.60 | .50@ .60<br>.60 | .50@ .60   |
| Columbus, O                               | .50        |         | .50   | 1.50                         | 1.50            | 1.25            | .60        |
| Des Moines, Ia<br>Elgin, Ill              |            |         | .50   | .50                          | .50             | 50              | 1.25       |
| Escanaba, Mich.                           | 1.00       |         | .00   | 1.20                         | 1.20            | 1.00            | 1.00       |
| Hawarden, Ia                              |            | .40@    |       | 1.20                         | .95@1.25        |                 | .85@1.00   |
| Greenville and Mechanics-                 |            | . 100   | .00   |                              | 100 (4 1:10     |                 | .00 @ 1.00 |
| burg, O                                   |            |         | .50   | .60                          | .60             | .60             | .60        |
| Illinois, Northern                        |            | .60@    | .70   | .70@ .80                     | .60@ .70        | .60@ .70        | .50@ .60   |
| Indianapolis, Ind                         | .50        |         | .50   |                              | .65             | .65             | .65        |
| Janesville, Wis                           |            | .50@    | .75   |                              |                 | .50@.75         |            |
| Kalamazoo, Mich                           | .50@ 60    | .50@    | 60    | .50@ .70                     |                 | .60@ .80        | .60@ .80   |
| Mason City, Ia                            | .60        | _       | .50   | 1.10@1.20                    |                 | 1.00@1.20       | 1.00@1.20  |
|   |            | Rai     |       | ballast and                  | road work       |                 |            |
| Milford, Ind                              | ********   |         | .60   | *******                      | *******         | .70             |            |
| Milwaukee, Wis                            | 1.06 fc    |         |       | 4 074                        | 1 000           | 4 174           | 4 400      |
| Minneapolis, Minn                         | .50*       |         | .50*  | 1.25*                        | 1.20*           |                 | 1.10*      |
| Malina III                                | 2800 lbs.  | 2800    | lbs.  | 2600 lbs.                    | 2600 lbs        |                 | 2600 IDS.  |
| Moline, Ill                               | .75        |         | .75   | yd. strge.                   | 75              | .75             | .75        |
| Niles, Mich                               |            | .50@    |       | 60@ 95                       | .50@ .80        | .50@ .80        | .50@ .80   |
| Sabula, Ia                                |            | .40@    |       | .75@ .85<br>.60@ .85<br>1.00 | 1.00            | 1.00            | 1.00       |
| Saginaw, Mich                             |            | · TO CO | .95   | 1.85                         | 1.85            | 1.60            | 1.60       |
| St. Paul, Minn                            |            |         | .65*  | 1.75*                        | 1.25            | 1.15*           |            |
| Terre Haute. Ind                          |            |         | .75   | .75@ .85                     | .75             | .75             | .75        |
| Wabash Valley District, Ind.              |            |         | ***   | All sizes                    |                 | •••             | • • • •    |
| Winona, Minn                              | 60@ .90    | .60@    | .90   | 1.00@1.40                    | 1.00@1.40       | .95@1.25        | .95@1.25   |
| Winona, Minn                              |            | -       |       | _                            |                 | _               |            |
| Charleston, W. Va. (River)                | 1.20       |         | 1.20  | 1.30                         | 1.30            | 1.30            | 1.30       |
| Lake Weir, Fla                            | *******    |         | .50   | *******                      | ********        | *******         |            |
| Jackson and Roseland, La                  |            |         | .50   | 1.00                         | 1.00            | 1.00            |            |
| Knoxville, Tenn                           | 85@ .90    | .85@    |       | 1.00@1.50                    |                 | .95@1.40        | .95@1.40   |
| Pelzer, S. C                              |            |         | Alls  | sizes, .55 per               | net ton         |                 | 4 074      |
| Valde Rouge, La                           |            | .75*@   |       |                              | 2.00            |                 | 1.25*      |
| Waco, Tex                                 | .75        |         | .75   | 1.20                         | 1.20            | 1.00            | 1.00       |
| WESTERN:                                  | 1.00       |         | .60   | .45                          | 1.50            | 1.25            | 2.00       |
| Joplin, Mo                                | . 1.00     | n lota  | build | ling sand,                   | 1.00            | 1 +magle 1 50   |            |
| Kansas City, Mo                           |            | i iots, | 55    | 1.50                         | 1.50            |                 | 1.40       |
| Lincoln, Neb.—(Pit)<br>Pueblo, Colo       | .80*       | ,       | 60*   | 1.00                         | 1.00            |                 | 1.40       |
| Roche Spur, Tulare Co., Cal.              | .00        |         | .00   | 35 River                     | sand ¼ in       |                 |            |
| San Francisco, Cal                        |            |         | 1.15  | for all gra                  |                 |                 |            |
| Seattle Wash                              | 1.25*      |         | 1.25* | 2.00*                        | 1.25            | 1.25            | 1.25*      |
| Seattle, Wash<br>Vancouver, B. C. (Scows) |            |         | 1.45* | 1.70*                        | 1.65            |                 |            |
|   |            |         |       | 2.10                         | 2,00            | 2.00            |            |

#### Bank Run Sand and Gravel

| City or shipping point EASTERN:                                 | Fine sand,<br>1/10 inch<br>down | Sand,<br>% inch<br>and less          | Gravel,<br>½ inch<br>and less | Gravel,<br>1 inch<br>and less | Gravel<br>1½ inch<br>and less         | Gravel,<br>2 inch<br>and less |
|---|---------------------------------|--------------------------------------|-------------------------------|-------------------------------|---------------------------------------|-------------------------------|
| Attica, N. Y  | .45@ 60                         | .40@ 60                              | .60                           | .60                           |                                       | .60<br>.60                    |
| Burnside, Sand Pit, Conn<br>Lowell Junction, Mass               |                                 | .50°@ .75                            |                               |                               |                                       | 1.25*                         |
| Pittsford, N. Y<br>Yardville, N. J<br>York, Pa.                 |                                 | .50 @ .75<br>.90@1.10                | (crushe                       |                               |                                       |                               |
| CENTRAL:<br>Cleveland O   |                                 |                                      | 1.00@1.75 ba                  |                               | .60                                   | .60                           |
| Covington, Ind  Des Moines, Ia.—Concrete mi Escanaba, Mich      | x. 20% to 3                     | 0% gr 60:                            |                               |                               | .80                                   |                               |
| Escanaba, Mich. Indianapolis, Ind Janesville, Wis Milford, Ind. |                                 |                                      | Concrete                      | mix .55                       | .50@ .75                              |                               |
| Moline, Ill   |                                 | .65                                  |                               |                               | .50<br>1.00                           | yd. stge.                     |
| Portsmouth, Ohio<br>Sabula, Ia<br>Saginaw, Mich.—(River         |                                 |                                      |                               | ********                      |                                       | .50@ .70                      |
| dock)   |                                 | *******                              | 1.20                          |                               |                                       |                               |
| Ind.<br>Toledo, O   |                                 |                                      |                               |                               |                                       | .50@ .60<br>.55@1.00          |
| Wabash Valley District, Ind.<br>Winona, Minn                    |                                 | Pit run                              | .75 for all<br>gravel und     |                               | @.90                                  |                               |
| SOUTHERN:<br>Howcott, La  | .75                             | 60                                   | 40                            |                               |                                       | .65                           |
| Knoxville, TennLindsay, Tex                                     | .85@ .90                        |                                      | .44                           | 44                            | ********                              |                               |
| Memphis, Tenn   | S                               | .65@ .90<br>and and gr<br>Gravel 60% | avel mixed<br>metal on 1/2    | for concrete                  | .85@1.10<br>e, .85@1.10<br>30 per ton | .85@1.10                      |
| WESTERN: Pueblo, Colo Vancouver, B. C                           |                                 | .85@1.10<br>B Bank T.                | ver Run .60                   | unscreened<br>1.00@1.25       |                                       | .85@1.00                      |

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#### Current Wholesale Prices in New York

(Continued from page 34)

Record and Guide. Allowances must be made for yard and store prices: Cement (wholesale, 1,000 bbls. lot and over, alongside dock, N. Y.)

Domestic Portland, spot ..... \$3.20@-Rebate on bags, returned, 25c a bag. Rosendale Natural to dealers, wood or duck bags..... Rebate on bags, returned, 10c bag.

Gravel (500 cu. yd. lots f. o. b. alongside dock N. Y., wholesale): 1½ in. (nominal)......\$2.00@—— Other size", no quotations.

Screened and washed Cow Bay, 500 cu. yds. lots, wholesale...\$1.25@-

Lime (standard 300-lb. bbls.): Eastern common, wholesale .\$2.70@-Eastern finishing, wholesale ..\$2.90@

Plaster-(Basic prices to dealers at yard, Manhattan):

Mason's finishing in 100 lbs. 

Crushed Stone (500 cu. yd. lots, f. o. b. alongside dock N. Y., wholesale): Trap rock, 1½ in. (nominal) ... \$1.85..—
Trap rock, ¾ in. (nominal) ... 2.00@——
Crushed limestone, 1½ in. ... 1.80@ 1.85
Crushed limestone, ¾ in. ... 1.90@ 2.00

Building Stone-Buff Mountain, per cu. 1t. 1.50

North River bluestone, per cu. ft. 1.05

Seam face granite, per sq. ft. 1.00

S. Dover marble (promiscuous mill blocks, per cu. ft. 2.25

White Vermont marble (sawed), New York year on ft. 3.00 York, per cu. ft...... 3.00

#### Memphis Looks Forward to Busy Year

MEMPHIS, Tenn.—The gravel, sand and cement trade here show some activity, a good inquiry for future delivery insuring high hopes for spring business.

Thos. B. King, one of the former county commissioners who recently attended a Good Roads meeting at Washington, D. C., has returned, committed to highway construction in the rural counties of the South as well as in the metropolitan districts.

The market is firm on cement products, labor situation gradually improving at gravel pits of the state. If the remainder of the winter is mild, building will start soon in some channels.

Louis Moss, of J. A. Denie and Sons Co., one of the officers of the Kiwanis Club, expeets to see the first six months of the new year full of activity.

Several school structures in Tennessee

and Arkansas are large building projects for the spring months. Improvements at the River Terminals here and bridge approaches and roadways of Eastern Arkansas and county road construction in Eastern Arkansas loom up. The Tennessee legislature will undoubtedly pass upon much new road and highway building.

The Morgan Engineering Co. of Memphis, will prepare plans for the construction of a drainage pumping plant in the Greenville, Miss., district of the Black Bayou drainage district of Washington county.

The Bankers' Trust Co. of Little Rock, Ark., were the successful bidders for \$149,-000 bonds issued by the commissioners of road improvement District No. 5 of Crittenden County, Ark. The commissioners propose to build a 12-mile concrete road to Seypel, Ark.

J. C. Baker is general contractor for a new grain elevator that will be erected on the Union Belt line at Memphis, capacity of 50,000 bu.

It is said that Memphis will be the hub of 15 highways in 1919, that many being developed in various directions entering this city.

#### Large Construction Plans for Texas

USTIN, Texas-Although the erection A of residences to solve the housing problem that exists in many of the cities and towns of Texas come first, preparations are being made for extensive construction operation in other lines.

One of the features of the after-the-war development movement will be the installation of many new public utility plants and the improvement of existing plants of that character. Orders are being placed for equipment for electric light and waterworks plants, and an increased demand for material for the construction of sewer systems is also to be noted.

Since the armistice was signed there has been a revival of several projects for the construction of interurban electric railways. One of the most important is the Southern Traction Co.'s projected extension from Waco south to San Antonio, about 185 miles. In this connection it was planned to build here a large electric power plant. It is now said that this company has under consideration the construction of a large central power station to be located in the lignite fields at Rockdale.

The Houston and San Antonio Interurban Railway Co. proposes to run a line between Houston and San Antonio, about 225 miles. The Dallas and Northwestern Interurban Railway Co. and the Dallas and Southwestern Interurban Railway Co., will resume construction work.

It is announced that the Dallas Railway Co., which under its new franchise, is required to construct two interurban lines out of Dallas, each to be not less than 30 miles long, will begin the work soon.

One of the encouraging features of the revival of construction and business projects in Texas at this time is the unusually favorable outlook for a splendid crop season in 1919.

According to advices received from the several deep water ports of Texas where shipbuilding yards are located this new industry will be continued upon practically as large a scale as it was during the war. In no instance has there been any announcement as yet of the abandonment of existing shipbuilding yards.

#### Texas Will Build Many Roads

CTEXAS will spend more than 25,000 .-000 in the building of roads in the next twelve months," Curtis Hancock, chairman of the State Highway Commission, said recently. "There are approximately 250 projects in the State under construction and contemplation.

"A wonderful impetus in highway activities is manifesting itself since the restrictions have been removed by the United States Highway Council at Washington. The department is going to find itself overwhelmed with road building in all sections of the State. A reasonable estimate of the bond issues ready for action is in the neighborhood of \$25,000,000.

"The difficulties to be encountered will be getting labor to do the work.

"The climatic conditions in Texas are such that road building can be continued through the winter season without much weather interference. We therefore expect a lot of road building through the winter and a continuation through the more favorable seasons.

#### California Starts Good Roads Activities

San Francisco—The greatest period of highway construction California has ever experienced is dawning. Merced County last month voted \$1,250,000 for good roads to be built after the war. The United States Office of Public Roads has had engineers in other counties mapping out comprehensive road systems as the basis of bond campaigns with the return of peace, and these counties will be ready soon to take up their campaigns. Still other counties are preparing for this greatest of all public improvements and will soon issue bonds with which to build roads.

The shortage of labor in many of the essential trades seems to be the only element at present which prevents the resumption of building operations on a large scale. There is a considerable demand for dwellings, but the continuation of high prices for labor and materials is quite apt to discourage the small builder. With the labor situation as it is at present, it will probably be some weeks or months before the great building boom which is bound to come will be fully under way.





#### Quarries

The American Lime & Stone Co., Frankstown, Pa., sustained a loss of \$25,000 by fire, the early part of December.

The Dunbar Stone Co., of River Rouge, Mich., carries this line in red across the face of their envelope: "There is nothing like Stone."

An organization known as the Limestone Association has been organized at Mt. Ver-non, Ill., for the purpose of supplying lime and limestone to the farmers. Marlin Rich is man-

The Coniagas Mines, Limited, of St. Catherines, Ont., advises that the report that this company had planned to build a plant for the treatment of Feldspar tailings at Craigmont, Ont., is erroneous.

Ont., is erroneous.

Wm. M. Farnham of Smethport, Pa., producer of Norwich carbonate of lime, with shipping points at East Smethport, Crosby and St. Marys, Pa., writes that his "agricultural lime is similar to the ground limestone but it comes in granulous condition and therefore do not screen the product."

Prisoners at the Southern Illinois penitentiary at Chester are turning out limestone dust at the rate of 60,000 tons a year, it is announced by the Department of Public Welfare, and plans are on foot to ask the fifty-first general assembly this winter to appropriate a sum sufficient to enlarge the limestone plant at Chester.

Charles Iddings, of Hanover, Ind., who has

Ilmestone plant at Chester.

Charles Iddings, of Hanover, Ind., who has used pulverized limestone, applying as much as five tons per acre, received this year from one field a yield of 32 bushels of wheat per acre. After the wheat was harvested he sowed buckwheat and harvested 20 bushels per acre from it this fall. Thus, this land yielded crops amounting to \$100 per acre in one season. He has decided it pays to use lime on acid soils.

#### Potash

Deposits of slates said to run high in potash content and high potash schists have just been located in Peckens county, Georgia, says a dispatch from Cartersville, Ga.

Nebraska provided about 90 per cent of the potash supply of the United States this year, according to a statement made by Will M. Maupin, state publicity director of Nebraska. Nebraska manufacturers, who have invested \$5,000,000 in the development of the potash industry, will produce more than \$20,000,000 worth of potash in 1918, according to Mr. Maupin. Many requests are made daily for information about the fields.

An American firm is about to erect a fac-

Maupin. Many requests are made daily for information about the fields.

An American firm is about to erect a factory in Brazil for the manufacture of potash and chemicals. The company has already purchased 720,000 square meters of land near the city of Santos, state of Sao Paulo, where it has been granted exemption of municipal taxes by the city of Sao Vincente. It is believed that the state of Sao Paulo will grant the company's request for exemption for a period of ten years of the payment of "Industrial and Professional" (i. e., on the business) tax, the state export tax, which is said to amount to some 12 per cent ad valorem, and the property transfer tax. The factory under full operation is estimated to produce daily 15 tons of caustic soda, 15 tons chloride of lime, 600 kilos of muriatic acid and 600 kilos of chlorate of potash. In these operations the company will use each day 25 tons of salt, 10 tons of lime, 400 kilos of muriate of potash and 3 tons of charcoal.

#### Cement

The Gold Hill (Ore.) Cement Works is said to be planning for the early resumption of operations at its local 1000 barrel plant. Fuel oil is used for power production, and difficulty in securing this fuel recently led to a shutdown.

The Crescent Portland Cement Co., Wampum, Pa., has purchased a large tract of land

from Mr. and Mrs. W. H. Murray, near Wampum. Part of the land runs into Wampum. The land will be used in the expansion and development of the cement company.

The United States Portland Cement Co., Denver, Col., has resumed operations at its mill after a shutdown of two months, due to a shortage of fuel. In the interval the mill was thoroughly overhauled.

a shortage of fuel. In the interval the miliwas thoroughly overhauled.

The Security Cement & Lime Co. sustained
a heavy loss by fire which destroyed the bag
room and one of the stock rooms at the company's plant at Security, Md., December 15.
It is understood that the loss will run between
\$25,000 and \$35,000, covered by insurance.

The International Portland Cement Co.,
Spokane, Wash., will be reorganized by the
formation of a corporation of similar name
with 50,000 shares of preferred for \$50 and
407,000 shares of common of no par value.
There are now outstanding 50,000 shares of
preferred stock and 152,312 shares of common.
Each holder of a share of common or preferred stock of the existing company will be
entitled to subscribe for two shares of the
new company at \$5 a share. The reorganization plan is being arranged to raise at least
\$1,500,000, part of which is to pay debts and
part to provide working capital.

In the making of cement from beet sugar,
process recently perfected by the French

part to provide working capital.

In the making of cement from beet sugar, a process recently perfected by the French, as mentioned in this magazine a few months ago, clay in considerable quantities is used. The scum from the beet boiling in cauldrons is pumped into large reservoirs and allowed to evaporate for a certain length of time before being mixed with the clay. It is then stirred or beaten for an hour before being fed into rotary ovens, such as is used in making Portland cement. The scum, it has been learned, contains carbonate of lime, and that 70,000 tons of beets will furnish 4,000 tons of carbonates. To this 11,000 tons of clay is added.

#### Manufacturers

The Jeffrey Manufacturing Co., Columbus, O., Catalog No. 244, which has just been completed, shows the advantages of using Jeffrey Standardized Elevators and gives other important data. This book contains 40 pages devoted to details of elevators selected out of numerous styles used in the handling of a wide range of materials in practically every industry of the country. A page is given to each elevator which is illustrated, both in perspective and in line drawing giving dimensions. There is also an illustration showing the chain and bucket used in that type of elevator, and at the bottom of each sheet is a full list of all specifications applying to that particular elevator.

#### Personals

A. Acton Hall, of the Ohio Marble Co., Piqua, O., and George D. Van Sciver, of sev-eral sand companies in the Philadelphia dis-trict, went to southern California for the trict, we holidays.

holidays.

W. F. Keckeisen, formerly advertising manager of the International Filter Co. and previously associated with the Federal Sign Co., has joined the staff of Russell T. Gray, advertising engineer, Chicago.

George France, president of The France Co., of Toledo, O., became a victim of the influenza in Chicago when he came to attend the Highways congress. He was confined to his room at Hotel La Salle and was unable to participate in the convention.

#### **Retail Dealers**

Barrett Milling & Produce Co. Thorp, Wis. Ernest H. Barrett, William Barrett, W. E. Barrett. Retail lime, brick, cement, etc. Capital, \$25,000.

#### Lime

The buildings and plant of the American Lime & Stone Co., located at Frankstown, Pa., were partly destroyed by fire December 3.. The loss will approximate \$25,000. The company will rebuild.

In some of the limestone sections of the state, notably the Susquehanna valley, scarcity of labor has reduced the output and farmers having quarries and kilns on their properties were unable to get men to work them. The use of lime as a fertilizer has increased enormously in Pennsylvania in the last two years.

Engineers are in Bellefonte, Pa., laying out plans for the proposed new hydrating plant for the American Lime & Stone Co., at the old glass works meadow. The plant will be chiefly of concrete and will cost \$400,000 or more. A. C. Morris, president of the company, stated that work on the foundations will be begun at once.

Hundreds of abandoned limekilns thruout Pennsylvania will be fired again this winter and next spring, according to opinions expressed at the December meeting of the state commission of agriculture. Reports indicate there will be a great demand for fertilizers next spring. As the supply and price of agricultural lime have been reported as unsatisfactory, steps will be taken to bring about a revival of the business.

#### Sand and Gravel

John Savidge, Philadelphia, is planning for the disposal of 24 acres of sand and gravel properties near Tullytown, Pa.

Amendment to articles of incorporation: Eau Claire Sand & Gravel Co., Eau Claire, Wis. Increase of stock from \$25,000 to \$50,000. F. E. Nicoles, president.

Amendment to articles of incorporations.

Amendment to articles of incorporation: Wisconsin Sand & Gravel Co., Milwaukee, Wis. C. P. Biesanz, Winona, Minn., president. Increase of stock from \$50,000 to \$90,000.

Perry-Baetzel Sand Co., of Rochester, N. Y., have ceased shipping from their pit at Bushnell Basin for the season, and report the barge canal closed for the winter. They will resume in May.

The Arkansas Gravel Co. recently incorporated in Arkansas by the Coppock interests of Ohio will dredge sand and gravel from the Mississippi river in the vicinity of Arkansas City, Ark. F. D. Coppock is president; M. E. White, vice-president; H. R. Brown, secretary-treasurer.

#### Incorporations

Silica Sand Co., Steelton, Pa. \$100,000. M. A. Cumbler.

Forest Port Sand & Gravel Co., Syracuse, N. Y. \$25,000. C. J. Parker, Jr., E. A. McDonald, H. J. Crane, Syracuse.

South Elgin Sand & Gravel Co., Chicago. Capital, \$30,000. Incorporators, Fred P. Handtmann, Edwin D. Lawlor and Gerard A. Connor.

Connor.

Marrion & O'Leary, Inc., Barre, Vt., granita. Capital, \$50,000. Incorporators, James T. Marrion, John O'Leary, Katherine D. Marrion and Margaret O'Leary, all of Barre.

The New York Trap Rock Corp., Rockland Lake, N. Y., has been incorporated with a capital of \$4,750,000, to manufacture traprock, crushed stone and other stone products. The company is now a going concern, with headquarters at 17 Battery place, New York V. D. H. Jones, R. W. Jones, Jr., and A. E. McVee are the incorporators.

#### Gypsum Products

Wages at the American Gypsum Co. plant, Fort Clinton, Ohio, have been increased five cents per hour.

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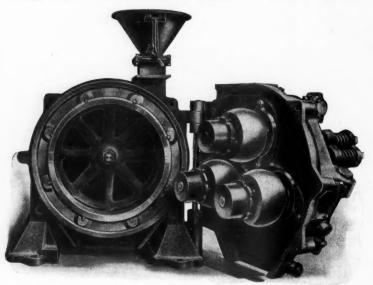


ONE MINUTE"



MACHINERY

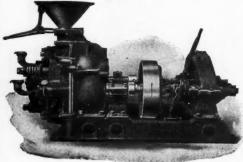
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Patented

Release the bolts, throw open the door and every wearing part is within easy reach. One man can open a five ton door in a very few minutes.

Is this not a time and labor saver? Can anyone afford a machine that takes hours and sometimes days to get into? They are slow speed durable machines crushing by spring pressure and not by centrifugal force.



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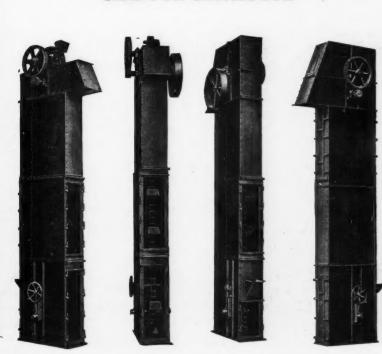
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All Steel, accessible construction, so that one man in one minute, can open any door, without the use of tools and immediately get at all important parts.

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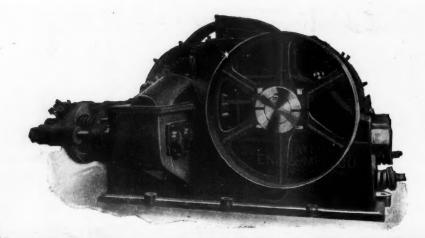
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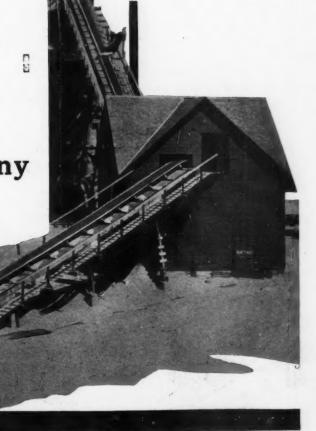
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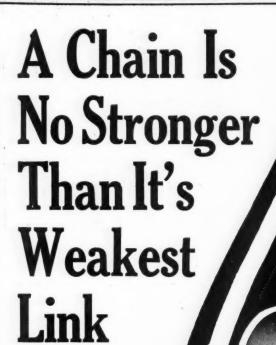
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